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BULLETIN No. 19.

U. S. DEPARTMENT OF AGRICULTURE.

BUREAU OF ANIMAL INDUSTRY.

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# THE INSPECTION OF MEATS

FOR

## ANIMAL PARASITES.

I. THE FLUKES AND TAPEWORMS OF CATTLE, SHEEP, AND SWINE,  
WITH SPECIAL REFERENCE TO THE INSPECTION OF MEATS.

By CH. WARDELL STILES.

II. COMPENDIUM OF THE PARASITES, ARRANGED ACCORDING TO THEIR  
HOSTS.

By ALBERT HASSALL.

III. BIBLIOGRAPHY OF THE MORE IMPORTANT WORKS CITED.

By ALBERT HASSALL.

Prepared under the direction of

**Dr. D. E. SALMON,**

CHIEF OF THE BUREAU OF ANIMAL INDUSTRY.

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## LETTER OF TRANSMITTAL

U. S. DEPARTMENT OF AGRICULTURE,  
BUREAU OF ANIMAL INDUSTRY,  
*Washington, D. C., October 4, 1897.*

SIR: I have the honor to transmit herewith, and to recommend for publication as Bulletin No. 19 of this Bureau, under the general title "The inspection of meats for animal parasites," a report on "The flukes and tapeworms of cattle, sheep, and swine, with special reference to the inspection of meats," prepared under my direction by Dr. Ch. Wardell Stiles, Zoologist of the Bureau. Appended to the report, and as valuable adjuncts thereto, are a "Compendium of the parasites" and a "Bibliography," prepared by Albert Hassall, M. R. C. V. S., of the Zoological Laboratory. Although the report is intended primarily for the use of the meat inspectors of this Bureau, it will be found of general interest to all sanitarians, since it treats of the communicability of certain parasites from animals to man, and suggests the necessary methods of prevention and treatment therefor. The publication and distribution of the bulletin will serve a useful purpose in disseminating knowledge of the precautions that are required to eradicate certain of the most important parasites affecting domesticated animals in this country—parasites which are a menace to the public health. Its early publication is desirable, as there is no work in the English language covering the subjects of which it treats.

Respectfully,

D. E. SALMON,  
*Chief of Bureau.*

## LETTER OF SUBMITTAL.

---

U. S. DEPARTMENT OF AGRICULTURE,  
BUREAU OF ANIMAL INDUSTRY,  
ZOOLOGICAL LABORATORY,  
*Washington, D. C., July 10, 1897.*

SIR: I have the honor to submit herewith for publication a report covering "The flukes and tapeworms of cattle, sheep, and swine, with special reference to the inspection of meats," prepared by myself, and the corresponding "Compendium of the parasites" and "Bibliography," prepared by Dr. Albert Hassall.

This report is intended primarily for meat inspectors, and contains discussions of the various flukes and tapeworms which our Bureau inspectors are likely to meet with on the killing floors of the abattoirs. Technical zoological details have for the most part been omitted, the stress being placed upon the practical application of our zoological knowledge to questions of public hygiene.

The more important parasites for the American inspectors are: The Common Liver Fluke and the Large American Fluke, which are serious dangers to the live stock; Beef measles, Pork measles, and Hydatids, all of which bear an important relation to diseases in man.

I would direct especial attention to the Hydatids. Hydatid disease is at present comparatively rare in this country, and now is the time to attack it. By proper precautions at the abattoirs and slaughterhouses this dangerous parasite can be totally eradicated from the country. If these precautions are not carried out it will be only a question of time when this country will take its place with Germany and Australia in respect to the number of human lives sacrificed to a disease which has not yet gained much ground with us and can now be easily controlled.

The illustrations of this bulletin were prepared by Mr. Haines, artist of the Bureau.

Respectfully,

CH. WARDELL STILES,  
*Zoologist of Bureau of Animal Industry.*

Dr. D. E. SALMON,  
*Chief of Bureau of Animal Industry.*

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# THE INSPECTION OF MEATS FOR ANIMAL PARASITES.

---

## I. THE FLUKES AND TAPEWORMS OF CATTLE, SHEEP, AND SWINE, WITH SPECIAL REFERENCE TO THE INSPECTION OF MEATS.

By CH. WARDELL STILES, Ph. D.,  
*Zoologist of the Bureau of Animal Industry.*

---

### INTRODUCTION.

*The object of the report.*—The present report on “The flukes and tapeworms of cattle, sheep, and swine, with special reference to the inspection of meats,” is intended primarily for the use of meat inspectors, and an effort has been made to bring together in systematic order the more important facts relating to the flukes and tapeworms which inspectors are likely to find in the abattoirs and slaughterhouses. For several reasons it is important that meat inspectors should be well informed upon both the practical and the theoretical considerations of this subject:

First. Since certain parasites (*Cysticercus cellulosae* and *C. bovis*) are directly transmissible to man through the use of meat, a knowledge of these worms will enable inspectors to prevent the spread of their tapeworm stage among human beings by condemning the infested meat or subjecting it to processes which will render it harmless. The rigid system of meat inspection in Germany has resulted in an actual decrease in tapeworm disease (by *Taenia solium* and probably also by *T. saginata*) in man and in the frequency of *C. cellulosae* in the human eye.

Second. Condemnation and destruction of organs infested with certain other parasites (*Echinococcus*, *Coenurus*, *Cysticercus tenuicollis*) will prevent the spread of these parasites in their tapeworm stage to dogs, and by that means prevent the reinfection of man (by *Echinococcus*) and of domesticated animals (by *Echinococcus*, *Coenurus*, *Cysticercus tenuicollis*); in this case prevention of tapeworm disease in dogs, though of comparatively little importance so far as the dogs are concerned, becomes very important not only in public hygiene (in the prevention

of disease in man and animals), but also from an economic standpoint, preventing financial loss to stock raisers from disease and death in their herds and flocks caused by these worms. The destruction of livers heavily infested with flukes will also result indirectly in decreasing fluke disease in man and live stock.

Third. Certain animal parasites (*Oysticercus cellulosae*, *C. bovis*, *Echinococcus*, etc.) may under certain conditions bring about pathological appearances in the meat which may at first sight be mistaken for tuberculosis. It is hardly necessary to insist upon the importance of a differential diagnosis between tuberculosis and diseases caused by animal parasites.

It is thus seen that the meat inspector is destined to render an important public service in the prevention of parasitic diseases, not only in man, but among domesticated animals.

Secondarily, this report is intended for the stock raiser, and an attempt has been made in the text to give him such information regarding the various parasites discussed as will be useful in preventing the spread of parasitic diseases among his animals. The stock raiser, whether the owner of a large herd or of but one or two animals, should never lose sight of the fact that his stock is raised not only as a money investment for himself, but as food for his fellow-men. To allow the introduction of certain diseases among his animals means not only a financial loss to himself, but a loss of health or life to those who may use these animals for food. To prevent these diseases is to increase the value of his investment and to aid the health authorities in preventing disease among his neighbors and his neighbors' stock. The stock raiser's position is therefore based not only upon dollars and cents, but also upon the broader plane of ethics, and he who intentionally or unintentionally and persistently loses sight of the ethical side of his occupation must necessarily suffer from the financial standpoint. The unprincipled action of placing diseased live stock on the market, instances of which can be cited from all civilized countries, is indeed a very short-sighted policy, which will sooner or later tell upon the purse of him who descends to such action, as well as upon the health of the community. A person who aids in concealing a smallpox or diphtheria patient from the health authorities and thus jeopardizes the health of his friends and neighbors justly earns the contempt of his fellow-beings as well as the punishment provided by law in some places; and a person who knowingly places diseased live stock or diseased meat on the market and thus endangers the health of those who consume the meat is none the less worthy of contempt and punishment.

In the third instance, this report is intended for butchers who handle meat which has not been inspected, as is unfortunately the case in many places, particularly in smaller towns. The writer has personally seen many towns where the meat supply was drawn almost entirely from local slaughterhouses, in which there was no inspection. Fre-



quently the butchers raised their own stock, or a portion of it, on the grounds of the slaughterhouses and under unhygienic conditions, which were not only most favorable to the spread of disease, but which must necessarily have resulted in the spread of infection among the animals raised upon the premises and in the neighborhood; especially in cases where the slaughterhouse was located on the banks of a creek or river.

In writing a report for the information of these three classes of persons, the author is well aware that technical language is not desired by the stock raiser and the butcher; a considerable amount of technical detail is, however, necessary in treating this subject in a manner which will be exact and complete enough for the expert inspector, who must view the questions from different standpoints. These technical details consist chiefly (1) of the classification and analytical keys to the various worms, necessary in order to properly determine the parasites found; (2) of detailed synonymy of each form, necessary because so many of the parasites are described in various works under different names; (3) details in regard to the life history of the worms, necessary in order to establish the proper methods of prevention; and, (4) details in the pathological appearances of diseased organs, necessary in order to differentiate between diseases which may bear a close resemblance to one another.

This technical discussion, necessary as it is to the expert inspector, has been forced to the background as much as possible by placing it in small type or in footnotes, and any, except sanitary officers and zoologists, who read this bulletin will do well to rely chiefly upon the discussion in large type.

*Scientific nomenclature and synonymy.*—One of the greatest aids in scientific work, giving exactness to statements and rendering the names of animals and plants international, is the use of Latin names for all plants and animals. These names should be given according to certain regulations agreed upon by workers in science, but owing to the disregard of these rules by some authors, many of the parasites discussed have received numerous technical names. In this paper the writer has endeavored to follow the international rules in selecting the technical name used for each parasite, and this name alone should be quoted in referring to the worms. The lists of synonyms are intended only as tables of reference, in order to trace the parasites as described by different authors.

*Authorities consulted.*—The majority of the parasites mentioned in the report have been known for many years and much has already been published upon them. In writing the report, therefore, I have not only drawn from my own personal studies, but have not hesitated to use the entire literature at my disposal. A list of the chief works consulted is given on pages 145–150, and of these I have used with special freedom Zürn (1882), Blanchard (1885–95), Neumann (1892), Railliet (1893), Oster-tag (1895), and my own papers.

## GENERAL METHODS FOR THE PREVENTION OF PARASITIC DISEASES.

"A well-regulated system of slaughterhouses is as necessary to public health as is a well-regulated system of schools to public education."

Under the subject of prevention there will here be considered chiefly those rules which apply to the parasites discussed in this paper. The methods of prevention naturally fall under several heads:

(1) *Segregation of slaughterhouses.*<sup>1</sup>—The first and most important step to be taken in order to prevent the spread of parasitic diseases is to segregate the slaughterhouses. In many places, especially in the West, we find two, three, four, or even five small slaughterhouses on the outskirts of a town of 300 to 2,500 inhabitants. These slaughtering places are scattered north, east, south, and west of the town; as they are often outside of the corporation limits, they do not come under the direct control of the local board of health; few, if any, of the State boards pay any attention to them, and as a result the meat supply is often without sanitary supervision.

The general rule may be laid down that every slaughterhouse is a center of infection for the surrounding neighborhood, not only of diseases caused by animal parasites, but also of other diseases, such as hog cholera, swine plague, tuberculosis, etc. The first step to be taken, therefore, is to reduce the number of localities from which infection may spread, and there is evidently only one way to do this, namely, to compel all the butchers of a town to do all of their killing at the same slaughterhouse. If the slaughtering is all done at one place, it is comparatively easy to control the class of animals used; but when numerous slaughterhouses exist, it is practically impossible to supervise the premises.

In many European cities and towns the slaughterhouse is built either at municipal expense or by a stock company, and stalls are let to the butchers for killing purposes. This plan has been found very satisfactory.

The places of slaughtering should be built of some more durable material, as brick, rather than wood; the less wood used the easier it is to keep the place clean. Even the floors should, if possible, be of brick, stone, or asphalt.

(2) *Sanitary supervision of slaughterhouses.*—There should be a competent veterinary inspector appointed as director of every slaughterhouse, with assistants if necessary. It should be the duty of the director and his assistants to see that the stalls and grounds are kept in proper sanitary condition, and that the offal is properly disposed of. In small towns, where there is not enough offal to pay for preparing it as fertilizer, there seems to be no valid sanitary objection to feeding the offal of healthy cattle and sheep to hogs; but offal of hogs should under no circumstances be fed to other hogs, unless it is first thoroughly cooked.

<sup>1</sup> Cf. Stiles, 1897. The Country Slaughterhouse as a Factor in the Spread of Disease. (Yearbook of the U. S. Department of Agriculture for 1896, pp. 155-166.)

(3) *Meat inspection*.—There should be a regular inspection, by a competent veterinarian, of all meats before they are allowed to leave the slaughterhouse.

(4) *Dogs and rats*.—Dogs should be excluded from slaughterhouses and meat shops, and all stray and ownerless dogs should be killed. This will prevent the spread of a number of dangerous parasites. Rats are common factors in spreading diseases from slaughterhouses, although they do not come into consideration in connection with any of the parasites discussed in this report.

(5) *The raising of hogs and other animals at slaughterhouses* is a custom which can not be too severely condemned, and the farmer who grants to a butcher the privilege of slaughtering on his farm in exchange for the use of the offal as feed simply bids for disease.

(6) *Deserted premises*.—In the segregation of slaughterhouses, which must come sooner or later, care should be taken to properly dispose of the houses which are deserted; an attempt should be made to kill the rats on the deserted premises, in order to prevent their spreading disease by wandering to neighboring farms, etc.

(7) *Domesticated animals* must not be allowed access to human excreta or to water supply contaminated by drainage from privies, vaults, etc.

#### TREATMENT.

The treatment of the verminous diseases of cattle, sheep, and swine, discussed in this report, may be summed up in two rules:

(1) The treatment for the larval tapeworms and the liver flukes must be preventive, as no medicinal treatment known is satisfactory.

(2) The treatment for the adult tapeworms and the intestinal flukes should be medicinal, as this is effective, and the life history of most of these worms still being problematical, we have no satisfactory data upon which to base preventive measures.

(For details regarding prevention and treatment,<sup>1</sup> see these captions under each parasite.)

#### THE DISPOSITION OF CONDEMNED MEATS.

The proposition that diseased meats which are dangerous as articles of food should not be allowed on the market is one which will receive universal support from all sanitarians and also from the thinking pub-

<sup>1</sup>In connection with the subject of treatment, I would call the attention of veterinarians to the necessity of not forgetting that a prescription written in one country does not mean the same in all countries. In dealing with pounds, ounces, and grains the apothecaries' weight, United States, agrees with the imperial standard troy, but many of the articles used in dosing large herds are purchased at avoirdupois weight. The apothecaries', United States, and the imperial liquid measures do not agree, a point which should be borne in mind in utilizing English formulæ in this country. Have not many accidents occurred because English formulæ were taken, and the fact overlooked that the English gallon is one-fifth larger than the United States gallon? Hutcheon's wireworm treatment (pp. 133-135), if adopted in this country without making due allowance for the difference in the size of the gallon, would probably result in heavy losses to the sheep owner.



lic. The question, however, arises as to the classes of diseased meats and the stages in these diseases that justify their condemnation or that justify their sale and the method of their disposal if condemned. It is not the purpose of this report to discuss the general aspect of these questions, but only to discuss them so far as the diseases caused by animal parasites are concerned.

In some foreign cities regulations exist, or have existed, compelling the burial or burning of meats affected with certain parasitic diseases. To such extreme regulations we are opposed for several reasons. In the first place, such destruction by burial or burning is in itself an expense. It also results in a total and unnecessary loss of the carcass. Again, the burial of a diseased carcass, unless buried in quicklime or other destructive material, does not meet either the practical or the theoretical requirements of destruction of diseased material. Take the disease trichinosis, for instance. In some places the carcasses of trichinous hogs have been buried by order of the sanitary officials. After this has been done, the owners of the carcass have disinterred the hog and it has been used for food!<sup>1</sup> Even had these men not disinterred the body and fed it to their friends and customers, the grave would have been accessible to rodents, such as rats, field mice, etc., which would be likely to feed upon the carcass, and thus become infected with the disease, resulting in a possible (theoretical!) ultimate transmission of the disease to other hogs. Finally, the writer is opposed to this method of destruction (?) on the ground that diseased or partially diseased carcasses can be utilized under certain conditions and restrictions, so that the owner will not lose the entire amount of his investment.

Three methods in particular are open, the method selected being dependent (1) upon the nature, extent, or stage of the disease, and (2) the facilities at hand. These methods are: (1) Utilization as fertilizer; (2) rendering the meats harmless by cold storage, cooking, or preserving, and then placing them upon the market; (3) selling the meats under a declaration of their character.

In determining the extent or stage of the disease and its relation to the method of disposition of the carcass, the opinion of the meat inspector must, of course, be based upon certain general principles and must naturally be final.

*Utilization as fertilizer.*—There is no parasitic disease known which will withstand the degree of heat used at the large abattoirs in the preparation of fertilizers. "Tanking for fertilizers" is therefore an absolutely safe method for the disposition of condemned meats, no matter how serious the infection is or to what extent the disease has progressed.

In connection with some parasitic diseases, however, a question arises as to the necessity of condemning to the tank certain diseased con-

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<sup>1</sup> This has happened a number of times in Germany, one case being reported within less than a year! (See *Zeitschr. f. Fleisch- und Milchhygiene*, 1897, VII, (5), p. 104.)

ditions. A case of generalized cestode-tuberculosis (*Cysticercus bovis*) should undoubtedly be "tanked," but in a very light infection the question takes a different aspect, namely: Can not the diseased portion be cut out and the rest of the carcass be placed on the block? To allow such meat on the market, leaving the consumer to suppose that he is purchasing a first-class article, is evidently an injustice to the buyer, for it is by no means certain that all of the parasites have been detected and removed. To condemn a light infection of this disease is, on the contrary, an injustice to the dealer, for there are methods by which the remaining parasites, if any, may be rendered harmless, and in this case the dealer could be saved a part of his loss. To judge between those cases in which the carcass is absolutely unfit for food, and therefore to be condemned, and those cases in which the carcass may be treated according to methods which will destroy the remaining but undiscovered parasites, thus rendering the meat fit for food, is a point upon which the expert meat inspector must decide.

To follow up the example cited, let us examine the effects of cold storage, cooking, and salting. It is evident that the method chosen must depend upon the facilities at hand. At a large abattoir any of these methods might be followed, but at a small country slaughterhouse the choice would be restricted.

*Cold storage.*—Experiment shows that the parasite under discussion (*Cysticercus bovis*) dies about two to three weeks after the death of its host. Three weeks of cold storage would therefore render a light infection of this kind absolutely harmless, and the meat could safely be placed on the block. With the disease known as pork measles the parasites live for a month or more, so that more care would be necessary in dealing with it.

*Cooking.*—Many of the abattoirs voluntarily tank for canning certain meats of inferior quality. The heat to which these meats are subjected is not so great as that used in tanking for fertilizers, but as *Cysticercus bovis* can not survive a temperature of 140° F. (see p. 81) for five minutes, and as the meats tanked for canning are thoroughly cooked, it may safely be asserted that a light case of "beef measles" would be rendered perfectly harmless by the cooking preparatory to canning.

The same applies to cases of trichinosis. The parasite of this disease can not withstand a heat of 70° C. (=158° F.), so that if trichinous pork is cooked until the entire piece has reached this temperature and assumed a light-gray color, the disease is rendered nontransmissible to man.

*Salting.*—The parasite of "beef measles" is killed in twenty-four hours by the action of salt solution, and we have found no case where the parasite of trichinosis has been able to withstand four months in the "pickling vats." In both of these cases it must be remembered that it takes some time for the salt to thoroughly permeate the tissue. It



would accordingly not be safe to assume that in a piece of measly beef which had been placed in brine for twenty-four hours the parasites had been killed. The length of time necessary to guaranty the result is, of course, dependent upon the size of the piece of meat.

*Selling infected meats under declaration.*—While the large abattoirs have means at their command by which cases of light infection may be rendered noninfectious, the smaller slaughterhouses are at more of a disadvantage in this respect. Cooking and salting would be possible for some—perhaps all of them—while cold storage would often be out of the question.

In this connection, it will be interesting to study for a moment a system which is quite extended in certain parts of Europe. Reference is made to the German "*Freibank*" or "*Finnenbank*." Under this system certain meats of inferior quality are allowed to be placed on the market under given conditions. One of these conditions is that they must be sold in a specified meat stall or counter, known as the "*Freibank*" or "*Finnenbank*," where the true nature of the meat must be made known to the purchaser. Naturally, such meats are sold at a lower price than the meats offered in open market, thus enabling many of the poorer classes to purchase meat who can not afford to pay the regular prices. Meats which are absolutely dangerous from a sanitary standpoint are, of course, excluded from these special meat counters, and in some instances the law requires that even these meats of inferior quality, which are harmful in some cases, though not dangerous, must be rendered harmless before being sold.

In the United States inspected meats are, generally speaking, either passed and allowed to go upon the open market or condemned and thus excluded from the market. The German system of the "*Freibank*" practically results in dividing the meats into three<sup>1</sup> classes, namely, first, meats which may be sold in open market—good or first-class meats

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<sup>1</sup> Strictly speaking, the Imperial German law of May 14, 1879, divides meats into five classes, as follows:

"1. Good or first-class wares which may be placed upon the open market without restrictions. This corresponds to the '*bankwürdiges Fleisch*' of the South German meat inspection regulations.

"2. Meat which may be placed upon the market under declaration and sold as 'spoiled (or waste) goods in the sense of the food laws.' Other disposition of this meat (as use in one's own family or presentation to other persons), is not prevented by law. This meat is called '*nichtbankwürdiges Fleisch*' in the older regulations.

"3. Meat which is unconditionally dangerous or injurious to health, the use of which, under any condition, as food for man, even use in one's own family, presentation to other people, or permitting it to be taken away, etc., is forbidden by law. This meat must be disposed of in such a way as to render it harmless.

"4. Meat which is injurious to health under certain conditions, but which can be rendered harmless by proper manipulation, such as cooking, sterilizing, pickling, etc. After the meat has been rendered harmless it may be placed on the market as

("gute oder tadellose Ware," of North Germany, "*bankwürdiges Fleisch*," of South Germany, also called "*bankmässig*" or "*ladenrein*"); a second class of meats which may be sold only under declaration of their true character, in many cases only after having been cooked or salted under official supervision ("*nichtbankwürdig*," "*nichtbankmässig*," "*nichtladenrein*"); a third class of meats which are unconditionally condemned, and therefore excluded from the market.

*History of the "Freibank."*—The system of the German "*Freibank*" and compulsory declaration of the condition of inferior meats is very old. The municipal laws of Augsburg in 1276 prescribed that inferior meat should not be sold without giving notice as to its quality. In 1404 the municipal laws of Wimpfen provided that the "*Freibank*" (from the German "*frei*," free, here in the sense of unconnected or separated, and "*Bank*," a counter or stall) should be situated three paces away from the regular counters. The "*Freibank*" (free stall) was, therefore, one which was free or separate from the regular counters. The term "*Finnenbank*" is sometimes used for these special meat stalls because the measly meat ("*finniges Fleisch*") especially is sold at these places. This system of "*Freibank*" has been extended to most of the slaughterhouses of Germany, and is rapidly extending in France, Belgium, and Italy.

The economic importance of the system is seen from the following statistics taken from Ostertag:

In the Kingdom of Saxony in 1892, 0.25 per cent of the animals

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spoiled (or waste) meat, in the sense of the food law. In regard to selling this kind of meat raw compare the legal decisions:

"An explicit statement by the seller that the meat, which is rendered harmless by cooking, is to be eaten only when cooked protects the merchant from penalty." (Urt. IV, v. II, 7, 1884.)

"A simple statement regarding the unwholesome condition of the meat on the part of the merchant to the purchaser does not, however, render the former free from penalty, for the danger to the communal interests of the act is not thereby obviated." (Urt., v. 15, 1 and 29, 9, 1885.)

"5. Finally, there should be recognized meat which is spoiled beyond use [literally, spoiled in high degree], i. e., meats which, though not unwholesome, have lost their value as food for man because of extensive changes in the tissue (for example, watery meat, meat and organs which are heavily infested with parasites, etc.). Such meats are to be judged as 'unfit for food,' and can be looked upon as 'spoiled' in the sense of sec. 367 of the penal code, and offering for sale and selling such meats are plainly forbidden by this paragraph. Their use in the household of the owner can not, however, be forbidden on grounds of the Imperial regulations. In order to prevent underhand traffic with such meat, it is provided that meat which is spoiled beyond use is to be entirely excluded from the market, except in such cases as portions of the same, such as the fat in heavily infected cases of pork measles, can be used for food.

"In meat wares we further distinguish imitations [*nachgemachte*] (meats which are treated in such a way as to appear different from what they really are, Urt. I, v. 15, 5, 1882), and adulterations [*verfälschte*] (meats which do not possess those qualities which they are supposed to possess in reliable traffic).

"I will call attention to the fact that the expert must use the word 'spoiled' [*verdorben*] only in the legal sense and not in the sense of decomposed meat, for decomposing [*faulende*] meat is injurious to health."—OSTERTAG, 1895, pp. 100, 101, et al.

slaughtered for food were unconditionally condemned, while 0.42 per cent of the animals slaughtered were sold at the "*Freibank*."

In Leipzig during 1891 the meat of 604 cattle, 89 calves, 28 sheep, 983 hogs, and 104 pieces, representing a total weight of 271,608 kilograms (about 543,216 pounds), was used by the "*Freibank*."

The average receipts per pound for the first quality meats and for the meat sold at the "*Freibank*" after deducting fees were as follows:

First quality.	Price.
Beef.....	57. 6 pfennige, about \$0. 144
Veal.....	55. 5 pfennige, about . 138 $\frac{3}{4}$
Mutton.....	58. 8 pfennige, about . 147
Pork.....	61. 0 pfennige, about . 152 $\frac{1}{2}$
Freibank.	Price.
Beef.....	53. 8 pfennige, about \$0. 134 $\frac{1}{2}$
Veal.....	44. 2 pfennige, about . 110 $\frac{1}{4}$
Mutton.....	54. 5 pfennige, about . 136 $\frac{1}{4}$
Pork.....	57. 4 pfennige, about . 143 $\frac{3}{4}$

Ostertag (1896) has recently published a detailed compilation giving the data concerning the sale of measly beef in 38 cities in Germany. At first there was great prejudice against the meat, so that in some cases the price fell to 2 $\frac{1}{2}$  cents per pound; but as this prejudice wore off the price went up 6, 8, and 10 cents per pound. In some places the demand for this cheaper meat is greater than the supply.

Objections to the "*Freibank*" have been raised by some parties, but we are unable to see wherein this system is unfair either to the dealer or to the purchaser, for no one is obliged to buy this meat who does not wish to do so, while anyone who wishes a cheaper class of meat can purchase it at the "*Freibank*" with the full knowledge of the condition of the meat he is buying. It is perfectly safe to use the meat when thoroughly cooked, and the dealer is able to economize in his business. We take the decided stand, however, that it is far better to subject all of these meats to thorough cooking or other methods of safeguarding before they are placed upon the market.

#### PARASITIC WORMS OF CATTLE, SHEEP, AND SWINE.

The term "cattle" in this report is used in the American sense of the word, i. e., for the species known zoologically as *Bos taurus*, the only bovine animal at present slaughtered in this country. Other animals also are known under the terms cattle, bulls, etc., in some countries, and a few parasites found in these animals are mentioned briefly in this report. These parasites are cited because the same species, or at least the same genera, are likely to infest *Bos taurus* sooner or later.

The term "sheep," as used here, refers to the only species of sheep slaughtered in the United States, i. e., *Ovis aries*.

The terms "hog," "pig," and "swine" refer to the only species of domesticated swine found in this country, i. e., *Sus scrofa domestica*.

The parasitic worms found in cattle, sheep, and hogs belong to two different zoological groups, known as Flat worms (*Plathelminthes*) and



Round worms (*Nemathelminthes*). The Flat worms alone are discussed in this report.

#### FLAT WORMS (Class *Plathelminthes*).

The Flat worms include at present five orders, only two of which, namely, the flukes (*Trematoda*) and the tapeworms (*Cestoda*), are discussed in this report.

**FLUKES, OR TREMATODES.**—The flukes found in cattle, sheep, and swine vary in size from a few lines to 4 inches in length and from one or more lines to an inch or more in breadth. They are found in the liver, lungs, intestine, and body cavity, and occasionally in other parts of the body. None of the species found in cattle, sheep, or swine are directly transmissible from these animals to man, although three of the species occasionally infest man. At least two of the species render the organs in which they occur unfit for food when present in numbers; they also injure the animals to a greater or less degree, although the extent of injury in cattle has possibly been overestimated; one form is particularly injurious to sheep.

**TAPEWORMS, OR CESTODES.**—Cestodes occur as larval forms (*bladder worms*) or as adult forms (*tapeworms*, *strobilae*).

*Larval tapeworms.*—The larvæ, or bladder worms (*Cysticercus*, *Coenurus*, *Echinococcus*), are found in the liver, lungs, brain, muscles, or other organs except the intestinal tract, and do not reach maturity until they are transmitted to meat-eating animals. The most important bladder worms considered in this report are: (1) The *Beef-measle Bladder Worm*, and (2) the *Pork-measle Bladder Worm*, both of which develop into tapeworms in man; (3) the *Gid Bladder Worm*, which causes gid, or turn-sick, in sheep; and, (4) the *Hydatid*, which causes hydatid disease in man and various domesticated and wild animals. When eaten by dogs the two latter bladder worms develop into Adult tapeworms.

*Adult tapeworms.*—Several different species are found in the intestine of cattle and sheep. They injure their hosts, but are not transmissible to man in any stage of their development.

The following key will aid the reader in determining the various flukes and tapeworms discussed in this report. A certain amount of technical knowledge is valuable in the use of this key, which is based upon zoological characters. Some liberty has, however, been taken with the anatomical characters in order to make the key as simple as possible; and it is believed that most, if not all, of the forms mentioned can be more or less definitely determined by comparing the key, especially the *habitat* given for each form, with the figures of the parasites, even if one is unable to follow the more technical statements.

#### KEY TO THE FLUKES AND TAPEWORMS OF CATTLE, SHEEP, AND SWINE.

[For the species thus far positively known to have been found in North America, follow Roman type.

As the characters given are confined to the forms discussed in this report, this key should not be relied upon to classify the parasites of other animals.]

- (1) Parasitic in the liver, lungs, pancreas, veins, abdominal cavity, or intestine of cattle, sheep, and swine, more rarely encysted in muscles of swine. Unsegmented Flat worms; intestinal tube present; anus absent; mouth with one sucker ..... *Flukes*, 2.

Parasitic in the intestine, more rarely in bile ducts, as adult segmented worms; or in the liver, lungs, muscles, etc., as unsegmented bladder worms. Intestinal tube absent; head with four suckers..... *Tapeworms*, 14.

## FLUKES.

## (Trematoda.)

- (2) Parasitic in liver, lungs, pancreas, veins, or abdominal cavity of cattle, sheep or swine, rarely encysted in muscles of swine. Ventral sucker (acetabulum) on anterior half of body ..... *Fasciolidae*, 3.  
Parasitic in intestinal tract or gall ducts of sheep, cattle, zebu, gayal, or buffalo. Ventral sucker (acetabulum) at posterior extremity ..... *Amphistomidae*, 9

*Fasciolidae*.

- (3) Parasitic in liver, lungs, pancreas, or abdominal cavity of cattle, sheep, or swine, more rarely encysted in muscles of swine. Hermaphrodites.... *Fasciolinae*, 4.  
Parasitic in the blood of cattle and sheep; eggs found forming egg tumors in genito-urinary tract or colon. Sexes separate ..... *Schistosominae*, 8.

*Fasciolinae*.

- (4) Parasitic in liver, lungs, pancreas, or abdominal cavity. Mature flukes, or forms in which the genital organs are developed to an extent which permits of a determination of the genus. Acetabulum sessile; genital pore between oral sucker and acetabulum; oral sucker unarmed..... 5.  
*Encysted in muscles of swine, very rare. Must not be mistaken for trichinae. Immature fluke, in which the organs do not permit of a determination of the genus. Body (fig. 1) 0.5 mm. long, elliptical, grayish, transparent; oral sucker terminal; ventral sucker near the middle of the body; pharynx followed by a short oesophagus and two simple intestinal caeca, which extend slightly beyond the middle of the body; in front of acetabulum are four large unicellular glands with rather long ducts, extending to oral sucker; three primordial genital glands in distal half of body; terminal excretory canal median, branching immediately distal of testicles.*

The Muscle Fluke of Swine (*Agamodistomum suis*), p. 28.

- (5) Parasitic in liver, lungs, rarely abdominal cavity of cattle, sheep, or swine. Body large, shaped like a flat fish, dark colored; intestinal caeca, testicles and ovary profusely branched; freshly laid egg does not contain embryo.

Fascioles (*Fasciola*), 6.

*Parasitic in liver or pancreas of cattle, sheep, or swine. Body smaller; intestinal caeca very simple, long, tubular, extending beyond acetabulum to posterior portion of body; oesophagus comparatively short; genital pore at bifurcation of intestine; testicles two, may be slightly lobate, near acetabulum; ovary posterior of and smaller than testicle, but anterior of transverse vitello-duct; ovary and testicles anterior of mass of uterine coils which extend to posterior end of the body.*

*Dicrocoeles (Dicrocoelium)*, 7.*Fascioles (Fasciola)*.

- (6) Parasitic in liver or lungs of cattle. Body (figs. 28-30) flesh-colored, very large and thick, 20 to 100 mm. long by 11 to 26 mm. broad; anterior conical portion not very distinct from posterior portion; posterior extremity bluntly rounded; vitellogene glands situated ventrally of intestine; oesophagus generally one and one-half times as long as pharynx; eggs 109 to 168  $\mu$  by 75 to 96  $\mu$ .

The Large American Fluke (*F. magna*), p. 49.

Parasitic in liver or lungs of cattle, sheep, hogs, etc. Body (figs. 2 and 3) 18 to 51 mm. long (occasionally longer) by 4 to 13 mm. broad; anterior conical portion generally very distinctly bounded from posterior portion; posterior extremity bluntly pointed; vitellogene glands both dorsal and ventral of intestine; oesophagus rarely one and one-half times as long as the pharynx; egg 105 to 145  $\mu$  by 63 to 90  $\mu$ ..... The Common Liver Fluke (*F. hepatica*), p. 29.



*Parasitic in liver of Senegal cattle. Body (figs. 23 and 24) 26 to 38 mm. long by 6 to 8 mm. broad, flat, linguiform, sides of posterior portion nearly parallel for some distance but tapering toward posterior extremity; ventral sucker large and prominent; egg 143 to 151  $\mu$  by 82 to 88  $\mu$ .*

The Narrow Liver Fluke (*F. hepatica angusta*), p. 48.

*Parasitic in the Indian buffalo (Bos bubalis) and cattle (Bos taurus). Body (figs. 25 and 26) 25 to 31 mm. long by 6 to 8 mm. broad; sides of body nearly parallel for some distance; posterior extremity somewhat rounded.*

The Egyptian Liver Fluke (*F. hepatica aegyptiaca*), p. 48.

*Parasitic in the liver of giraffes and cattle (?). Body (fig. 27) 75 mm. long by 3 to 12 mm. broad, flat, oblong, lanceolate; anterior extremity cylindrical, attenuate; posterior extremity obtuse; sides nearly parallel for greater part of length; oral sucker 1.12 mm. in diameter, ventral sucker somewhat larger; oesophagus extends nearly to acetabulum; 8 to 10 lateral branches to each intestinal caecum; other organs agree with F. hepatica..... The Giant Fluke (*F. gigantica*), p. 49.*

#### Dicrocoles (Dicrocoelium).

(7) *Parasitic in liver of cattle, sheep, and swine. Body (figs. 36 and 37) lancet form, 4 to 10 mm. long by 1 to 2.5 mm. broad; anterior end much more attenuate than posterior end; semitransparent, spotted brown by eggs; cuticle without spines; oral sucker 0.5 mm. in diameter, subterminal; ventral sucker 0.6 mm. in diameter, one-fifth the length of body back of mouth; mouth followed by an oesophagus which, about halfway between oral sucker and acetabulum, immediately in front of cirrus pouch, branches into two simple intestinal caeca; the latter extend one each side to about the posterior quarter of the body; cirrus pouch present; cirrus long, filiform, straight; testicles lobed, one posterior to the other, and situated immediately posterior of acetabulum; uterus sinuous, very long, extending backward beyond the end of the intestine to posterior portion of body, then running forward in loops to genital pore, and rendered prominent by presence of brown eggs; vitellogene glands in marginal portion of middle third of body; eggs (fig. 38) 40 to 45  $\mu$  by 30  $\mu$ , containing embryo at time of ovipont..... The Lancet Fluke (*D. lanceatum*), p. 55.*

*Parasitic in pancreas of "cattle," Indian buffalo, and sheep, in Asia. Body (fig. 40) somewhat similar to the common fluke but proportionally broader and more pointed at distal extremity; 8 to 15 mm. long by 5 mm. broad; blood red in color; cuticle without spines; oral sucker subterminal; ventral sucker slightly larger than oral sucker, one-third the length of the body back of the mouth; pharynx, oesophagus, and intestines about the same as in D. lanceatum; cirrus-pouch pyriform; testicles irregularly lobed, in lateral portion of median field, on same transverse plane, near acetabulum; uterus of similar type to that of D. lanceatum; vitellogene glands only about one-fifth as long as body, situated in marginal portion of middle third; eggs ovoid, thick shelled, 44  $\mu$  to 49  $\mu$  by 23  $\mu$  to 30  $\mu$ .*

The Pancreatic Fluke (*D. pancreaticum*), p. 57.

#### Blood Flukes (Family Schistosominae; Genus Schistosoma).

[Acetabulum penduculate; intestinal caeca unite or anastomose distal of acetabulum; male shorter, thicker, and broader than female, the margins curling ventrally to form canal for filiform female; testicular complex consists of a double series of four or more sacular bodies.]

(8) *Parasitic (fig. 41) in blood of man and cattle (?). Male 4 to 14 mm. long by 1 mm. broad; female attains 13 to 20 mm. long by 0.28 mm. broad by 0.21 mm. thick; eggs ovoid to fusiform 120 to 197  $\mu$  long by 40 to 73  $\mu$  broad.*

The Human Blood Fluke (*S. haematobium*), p. 58.

*Parasitic (fig. 45) in blood of cattle. Body thicker than the Human Blood Flukes; the dorsal surface of the inner fold of the male is provided with a longitudinal groove (fig. 46) into which the end of the outer fold extends; eggs fusiform, 160 to 180  $\mu$  by 40 to 50  $\mu$  ..... The Bovine Blood Fluke (*S. bovis*), p. 60.*

*Amphistomes (Amphistomidae).*

- (9) Parasitic in intestinal tract or gall ducts of sheep, cattle, zebu, and gayal.  
 Pharynx without lateral sacs ..... 10.  
*Parasitic in intestinal tract of zebu and gayal. Pharynx with two lateral sacs; the greater part of the ventral surface of posterior portion of body is covered with numerous papillae* ..... *Homalogaster*, 13.
- (10) Parasitic in intestinal tract or gall ducts of sheep, cattle, and zebu. Ventral pouch very small or absent ..... True *Amphistomes (Amphistoma)*, 11.  
*Parasitic in intestinal tract of cattle, zebu, gayal, and Indian buffalo. Ventral pouch large, extending to posterior portion of body.*  
 Pouched *Amphistomes (Gastrothylax)*, 12.

*True Amphistomes (Amphistoma).*

- (11) Parasitic in rumen of sheep and cattle. Body (figs. 49 and 50) 4 to 13 mm. long by 1 to 3 mm. broad; conical, pinkish white. The Conical Fluke (*A. cervi*), p. 64.  
*Parasitic in gall bladder and hepatic ducts of zebu. Body lanceolate, 8 to 10 mm. long by 3 to 4 mm. broad, rather similar to the Conical Fluke, but somewhat flattened dorso-ventrally.* ..... *A. explanatum*, p. 67.  
*Parasitic in stomach of zebu. Body (fig. 56) somewhat similar to A. cervi, but more oval, and somewhat flattened dorso-ventrally; about 11 mm. long by 6.6 mm. broad.*  
*A. bothriophorum*, p. 67.

*Pouched Amphistomes (Gastrothylax).*

- (12) *Parasitic in stomach of zebu and cattle. Body (figs. 57-62) reddish brown to grayish green, 9 to 15 mm. long by 4 to 5 mm. broad* ..... *G. crumenifer*, p. 67.  
*Parasitic in stomach of gayal. Body (fig. 63) pyriform, 10 mm. long by 5 mm. broad at posterior extremity* ..... *G. Cobboldii*, p. 67.  
*Parasitic in stomach of gayal and zebu. Body attains (fig. 64) 20 mm. long by 4 mm. broad; intestine only half as long as body* ..... *G. elongatum*, p. 67.  
*Parasitic in stomach of Indian buffalo. Body (figs. 65 and 66) deep red, cylindrical to conical, attains 7 to 10 mm. long by 2 to 2.5 mm. broad* ..... *G. gregarius*, p. 67.

*Homalogaster.*

- (13) *Parasitic in caecum of gayal. Body (fig. 67) lanceolate; testicles small.*  
*H. paloniae*, p. 67.  
*Parasitic in caecum of "cattle" (= (?) zebu). Body — mm. long; oral sucker with digitate papillae; testicles lateral and divided into two equal lobes with irregular contours, so that there appear to be four testicular masses* ..... *H. Poirieri*, p. 67.

## TAPEWORMS.

## (Cestoda.)

- (14) Larval tapeworms or bladder worms (figs. 68, 76, 84, 97, and 105) parasitic in muscles, liver, lungs, etc., but not in lumen of intestinal tract; the head, which is generally provided with hooks, lies inside the cyst; body unsegmented, generally surrounded by a cyst of connective tissue; no genital organs developed; these forms become adult in man and carnivorous animals, and are of great importance from the standpoint of meat inspection... *Taeniinae*, 15.  
 Adult tapeworms (fig. 111), found in the intestine of cattle, sheep, and swine (?), or in gall ducts of sheep ..... *Anoplocephalinae*, 18.

*Bladder Worms, or Larval Tapeworms (Hard-shelled Tapeworms, Subfamily Taeniinae; Genus Taenia).*

- (15) Parasitic in muscles, abdominal cavity, lungs, and liver. One head in each cyst ..... Bladder Worms (*Cysticercus*), 16.  
 Parasitic in any organ of body except intestine, most frequent in liver, lungs, and brain. Numerous heads may be present ..... 17.

*Bladder Worms (Cysticercus).*

- (16) Parasitic in cattle; found in the muscles, especially those of mastication, more rarely in lungs or liver. Body (fig. 68) spherical to elliptical, 2.5 to 10 mm. long by 3 mm. broad; whitish to gray, with a small yellowish spot due to the invaginated head; no hooks present; the bladder contains but little liquid. Transmissible to man..... Beef Measle Bladder Worm (<sup>1</sup>*C. bovis*), p. 71.
- Parasitic in swine; found in the muscles. Body (figs. 75 and 76) ellipsoid, 6 to 10 mm. long by 5 to 10 mm. broad, with a white spot corresponding to the invaginated head; head armed with a double row of 24 to 32 hooks of two different sizes (see description of adult, p. 84); the bladder contains but little liquid. Transmissible to man..... Pork Measle Bladder Worm (<sup>1</sup>*C. cellulosae*), p. 89.
- Parasitic in cattle, sheep, and swine; young stages in the liver, older stages found hanging into the body cavities, attached to omentum, etc. Bladder (figs. 84, 91, and 92) large, varying from size of a pea to that of a man's fist, occasionally attaining 160 mm. by 60 to 70 mm.; neck long; invaginated head armed with a double row of 28 to 44 (generally 36 to 38) hooks, of two sizes (see description of adult, p. 101); the bladder contains considerable liquid. Transmissible to dogs, but not to man.

The Thin Necked Bladder Worm (<sup>2</sup>*C. tenuicollis*), p. 96.

*Cocnurus and Echinococcus.*

- (17) Parasitic in nervous system, especially the brain, of sheep and calves. Bladder (figs. 94 and 97) varies from size of a pea to that of a hen's egg, and is composed of a hydatid cyst (cuticle thin) which forms numerous small invaginations (as many as 500 in large specimens), in each of which a head develops without the formation of brood capsules; head armed with a double row of 22 to 32 hooks, of two sizes (see description of adult, p. 101). Transmissible to dogs, but not to man.

The Gid Bladder Worm (<sup>2</sup>*Coenurus cerebralis*), p. 108.

- Parasitic in any organ, particularly the liver and lungs of man, cattle, sheep, swine, etc. Bladder (figs. 101 and 105) varies from size of a pea to that of a child's head, assuming different forms, as described on p. 102; the hydatid cyst has a thick laminated cuticle; the heads are armed with a double row of 28 to 50 hooks, of two sizes (see characters of adult, p. 101), and develop in brood capsules, which are attached to the cyst wall. The adults develop in dogs, but not in man. This is the most important parasite of meat inspection..... The Echinococcus Hydatid (<sup>2</sup>*Echinococcus polymorphus*), p. 113.

*Adult tapeworms of Cattle, Sheep, and Swine (?) (Subfamily <sup>3</sup>Anoplocephalinae).*

- (18) Posterior border of segments not fringed; parasitic in the intestine..... 19.
- Posterior border of segments fringed (figs. 122 and 124). Parasitic in intestine and bile ducts of sheep. Genital pores double; strobila 15 to 30 cm. long; head large, 1.5 mm. broad, nearly square on apex view; neck flat, broad, and short; broadest segments measure 5 to 8 mm. wide by 0.4 to 0.6 mm. long, and are situated about 2 cm. from posterior end, the end segment showing a decided tendency to become longer and narrower; gravid segments attain 2.2 mm. in thickness; uterus single, transverse, but undulate with cornucopia-like egg pouches; testicles form a band in distal portion of median field; horns of pyriform body around embryo not developed.

The Fringed Tapeworm (*Thysanosoma actinioides*), p. 128.

<sup>1</sup>For characters of the adult form in man, see key, p. 84.

<sup>2</sup>For characters of the adult form in dogs, see key, p. 101.

<sup>3</sup>This key to the adult forms is extremely artificial, as characters have been selected which will most easily enable a determination of the worms. For a key expressing more closely the true relations of the forms to each other, see Stiles & Hassall, 1893, p. 88, and Stiles, 1896, p. 214.



- (19) Genital pores double, segments generally quite broad; pyriform body well developed. Parasitic in cattle and sheep..... *Moniezia*, 20.  
*Genital pores usually single, rarely double, and then only in strobilae, which contain single-pored segments in the majority. Parasitic in sheep, cattle (?), and swine (?). Strobila 1 to 2 meters long; head 0.5 to 1 mm. broad; neck absent or present; most of the segments broader than long, only the posterior segments longer than broad; unripe segments often present a zigzag appearance; largest segments 5 to 6.5 mm. broad by 1 to 2 mm. long; testicles divided into two groups and confined for the most part to the lateral fields; uterus same as in the Fringed Tapeworm.*

Giard's *Thysanosoma* (*Th. Giardi*), p. 129.

*Genital pores single; segments very narrow. Parasitic in sheep and cattle (?).*

*Stilesia*, 24.

#### *Moniezia*.

- (20) *Interproglottidal glands absent*..... *Alba* group, 21.  
*Interproglottidal glands linear (fig. 113)*..... *Planissima* group, 22.  
*Interproglottidal glands circular, groups around blind sacs (fig 118).*

*Expansa* group, 23.

*Neck absent; head large, decidedly lobed; strobila 40 cm. long; segments attain 8 mm. in breadth. Doubtful species, parasitic in sheep*..... *Moniezia nullicollis*.

- (21) *Parasitic in sheep. Strobila nearly half a meter long by 2.5 mm. broad; gravid segments may attain 2.5 mm. broad by 5 mm. long; genital pores in middle or anterior half of lateral margin; cirrus pouch about 0.18 mm. long; eggs 60  $\mu$ , pyriform body 20  $\mu$ , horns end in a knob*..... *Vogt's Moniezia (M. Vogti)*, p. 127.  
*Parasitic in sheep and cattle. Strobila 0.60 to 2.5 meters long; head subquadrangular, 1.15 to 1.4 mm. broad; neck 1.5 to 5.3 mm. long; gravid segments attain 8 to 14 mm. broad by 2 to 6.5 mm. long by 1.5 mm. thick; testicles arranged in a quadrangle; eggs 60 to 88  $\mu$ , bulb of pyriform body 16 to 24  $\mu$ , horns 8 to 20  $\mu$ .*

*The White Moniezia (M. alba)*, p. 127.

- (22) *Parasitic in cattle and sheep. Strobila (fig. 111) 1 to 2 meters long; yellowish; head 0.4 to 0.9 mm. broad; neck thin, short or long; segments always broader than long; gravid segments attain 12 to 26 mm. broad by 1 to 1.75 mm. long, generally thin and flat; interproglottidal glands large and very distinct; testicles arranged at first in two triangles, in older segments in a quadrangle; 400 to 600 testicles present in a segment; eggs 63  $\mu$ , bulb of pyriform body 20  $\mu$ , horns 24  $\mu$* ..... *The Flat Moniezia (M. planissima)*, p. 127.

*Parasitic in sheep and cattle. Strobila attains 4 meters in length; head about 1 mm.; neck 2 to 2.5 mm. long; suckers very distinctly lobed and sharply separated from neck; segments always broader than long; gravid segments may attain 12 mm. broad by 3 mm. long by 2 mm. thick; interproglottidal glands extremely indistinct; eggs 80 to 85  $\mu$ , pyriform body 18  $\mu$ ..* *Van Beneden's Moniezia (M. Benedeni)*, p. 128.

*Parasitic in sheep. Strobila 1.5 to 2 feet long; head square, 0.9 mm.; gravid segments attain 8 mm. broad by 1.5 mm. long; but the end segments may measure 6 mm. broad by 2 mm. long; testicles arranged in a quadrangle; interproglottidal glands small; eggs 55 to 65  $\mu$ .....* *Neumann's Moniezia (M. Neumanni)*, p. 128.

- (23) *Parasitic in cattle and sheep. Strobila (fig. 116) attains 4 to 5 meters in length; anterior portion usually whitish, posterior portion usually yellowish; head 0.36 to 0.7 mm. broad; segments always much broader than long, gravid segments attaining 16 mm. in width and are quite thick; end segments never as long as broad; testicles usually arranged in a quadrangle, rarely in two triangles except in younger segments; eggs 50 to 60  $\mu$ , bulb of pyriform body 20  $\mu$* ..... *The Broad Moniezia (M. expansa)*, p. 128.

*Parasitic in sheep. Strobila (fig. 120) attains 1.6 to 2 meters in length; cream to whitish in color; head 0.6 to 0.7 mm. broad; neck filiform, 2 mm. long; segments generally broader than long, rarely over 6 mm. broad by 2 mm. long; although end segments are occasionally found which are square or even slightly*

longer than broad; testicles usually arranged in two triangles; eggs 52 to 60  $\mu$ , bulb of pyriform body 20 to 24  $\mu$ , horns 12 to 15  $\mu$ .

The Triangle *Moniezia* (*M. trigonophora*), p. 128.

*Stilesia*.

(24) *Strobila* transparent, whitish or grayish yellow, 45 to 60 mm. long, not over 2.5 mm. broad; head 0.5 to 1 mm. broad; median portion of median field transparent; two lateral cornucopia-like egg pouches present in each segment.

The Globipunctate Tapeworm (*S. globipunctata*), p. 130.

*Strobila* attains nearly 3 meters in length, but not over 3 mm. in breadth; head 1.5 to 2 mm. broad; median field occupied by transverse uterus.

The Centripunctate Tapeworm (*S. centripunctata*), p. 130.

## FLUKES, OR TREMATODES (Order Trematoda).

The following technical description shows the systematic position and general structure of the flukes under discussion:

[Suborder Malacocotylea: Digenea. Families Fasciolidae and Amphistomidae.  
See figs. 3, 29, 30, 37, 41, 42, 43, and 50.]

With the exception of the Blood Flukes (*Schistosoma*), they are all hermaphrodites. They are flat or conical worms, always longer than broad; on the anterior extremity is situated the mouth, surrounded by a muscular organ, known as the *oral sucker* and curved slightly ventrad. There is a second sucker (the *acetabulum*), which is situated in the median ventral line; in the Fasciolidae the acetabulum is generally found on the anterior half of the body, while in the family Amphistomidae it is at or near the posterior extremity. The surface of the worms is generally more or less covered with minute spines, or tubercles.

The *digestive tract* consists of the mouth, a short oesophagus, and two blind sacs (*intestinal caeca*), which represent the true intestine. The anterior portion of the oesophagus is generally connected with the mouth by a muscular bulb (the *pharynx*); the posterior extremity bifurcates, one branch being connected with each intestinal caecum. The intestinal sacs are usually simple elongated tubes, but in the genus *Fasciola* they branch freely (fig. 29). In *Schistosoma* the two caeca unite after passing the acetabulum. An anus is never present.

*Genital organs*.—The *genital pore* is in the ventral median line in all species here described, the male copulatory organ (*cirrus* or penis) lying very close to the female opening (*rulva*). *Male organs*: A cirrus is frequently seen extruded from the genital pore, and in those cases it appears as a curved organ, varying in size according to the species; usually the cirrus is invaginated in the *cirrus pouch*. Through its center runs a canal (the *ductus ejaculatorius*) which receives the spermatozoa from a *resicula seminalis*. The latter is partially or entirely included in the pouch; at its posterior end it receives the two *vasa deferentia*, through which the spermatozoa are conducted from the testicles. The testicles, generally two in number, one right and one left, are more or less round, lobed, or branched. *Female organs*: The vulva leads into a canal, the anterior portion of which is known as the *metraterm*; this is continued as the *uterus*, which forms more or less numerous folds in the median portion of the body and finally leads to the so-called *shell-gland* which may frequently be seen in fresh specimens (*F. magna* and others) as a round body a short distance posterior of the acetabulum. In the center of the shell gland is a canal (the *ootyp*), in which four canals (*uterus*, *oviduct*, *Laurer's canal*, and *vitello-duct*) come together. The *ovary* in some species is globular, in others branched, and connects with the ootyp through the *oviduct*. The *Laurer's canal* runs from the ootyp dorsad in curves and opens to the exterior on the dorsal surface; its function is still doubtful, but



homologically it represents the uterus of cestodes. The *vitellogene glands* are two in number and are situated laterally of the longitudinal intestinal tubes; they vary in size in different species, are generally quite elongated, and are composed of numerous branches much like a bunch of grapes in form, all of which connect with a longitudinal *vitello-duct* (one on each side of the body); these longitudinal ducts are in turn connected by a pair of transverse ducts which unite in the median line, immediately posterior of the shell-gland, to form a common reservoir; this in turn empties into the ootyp through the short vitello-duct mentioned above. The vitellogene glands produce yolk cells which are associated with the true ovum to form the eggs.

*Excretory system.*—At or near the posterior extremity, generally somewhat dorsally, is situated a small pore (*porus excretorius*), which leads into a *median terminal vesicle*; this latter gives off longitudinal branches; these in turn give off secondary branches which ramify throughout the body, each small branch ending in an excretory organ.

*Nervous system.*—A set of ganglia is found at each side of the pharynx; these ganglia are connected by a dorsal commissure and give off numerous nerves to various parts of the body. The largest nerves are the two ventral longitudinal nerves which run antero-posteriorly, and can frequently be seen in fresh specimens.

*Development.*—See p. 30.

Cattle (*Bos taurus*) are alleged to be infested with fifteen kinds of flukes, only two of which, the Large American Fluke and the Common Liver Fluke, are positively known to occur in the United States. Osler has found the Conical Fluke at Montreal, where it was not uncommon; he also found the same parasite in cattle in Nova Scotia.

Sheep (*Ovis aries*) are infested with five known species of flukes, only one of which, the Common Liver Fluke, is known to be in the United States; the Conical Fluke, as stated above, is found in Canada.

Hogs (*Sus scrofa domestica*) harbor three known species of flukes, only one of which, the Common Liver Fluke, is found in the United States. Willach (1893) has described a *Monostomum hepaticum suis* from the liver of hogs; this supposed fluke is evidently a partially developed bladder worm (*Cysticercus tenuicollis*) (see p. 96).

## DISTOMES (Flukes of the Family Fasciolidae).

### Hermaphroditic Distomes (Flukes of the Subfamily Fasciolinae).

#### AGAMIC, OR IMMATURE, DISTOMES (Genus Agamodistomum).

This is a purely artificial group, of biologic rather than systematic nature. One immature fluke is occasionally found encysted in the muscles of hogs.

##### 1. The Muscle Fluke of Swine (*Agamodistomum suis*).

[Fig. 1.]

SYNONYMY.—*Distomum musculorum suis* Duncker, 1896.

BIBLIOGRAPHY.—Duncker (1896).

This small (0.5 mm. to 0.7 mm. long by 0.2 mm. broad) parasite was discovered in 1881 by G. Leunis (a trichina inspector in Saxony), and has since been found by several other trichina inspectors of Germany. As it appears never to have been binomially named, I propose to call it

*Agamodistomum suis*. The worm lies free or encysted in the connective tissue between the muscle fibers; it is exceedingly rare and is of no known practical importance in meat inspection, except that in a superficial and careless microscopic examination it might be mistaken for sarcosporidia, or possibly for trichinae. Nothing is known of its life history, but it is supposed to be a purely accidental parasite in swine. We are not aware of its ever having been recorded in this country.

## FASCIOLES (Distomes of the Genus Fasciola).

The genus *Fasciola* contains the large, flounder-like parasites found especially in the liver of herbivorous animals and known under the general term "*liver flukes*." Of these Fascioles, or "*liver flukes*," we find two forms in American cattle (*F. magna* and *F. hepatica*), one form (*F. hepatica*) in American sheep, while a third form (*F. Jacksoni*<sup>1</sup>) has been found in North America, South America, and in India in the liver of elephants, and a fourth form (*F. gigantea*<sup>1</sup>) is described by Cobbold from the liver of the giraffe. It is quite generally admitted that these Fascioles, owing to their larger size, are more harmful than other flukes.

Until a short time ago it was supposed that we had but one form of fluke in American cattle, but Hassall (1891) and Francis (1891) showed, almost simultaneously, that two distinct forms are found, one form (*F. hepatica*) being present in the liver, very rarely in the lungs, the other (*F. magna*), a much larger worm, infesting both liver and lungs.

## 2. The Common Liver Fluke (*Fasciola hepatica*) of Cattle, Sheep, Swine, etc.

[Figs. 2-22.]

For anatomical characters, compare fig. 3 with key, p. 21.



FIG. 2.—The Common Liver Fluke (*Fasciola hepatica*), natural size (original).

VERNACULAR NAMES.—English, *Common Liver Fluke*; German, *Leberegel*, *Leberwurm*, *Schafegel*; Dutch, *Botten*, *Leverwurm*; Danish, *Faareflynder*; Swedish, *Levermask*; French, *Douve hépatique*, *fasciole*; Italian, *Biscuola*, *distoma epatico*; Spanish, *Caracolillo*.

SYNONYMY.—*Fasciola hepatica* Linnaeus, 1758; *Planaria latiuscula* Goeze, 1782; *Distoma hepaticum* (Linnaeus) Abildgaard (?); *Fasciola humana* Gmelin, 1790; *Distoma* (*Cladocoelium*) *hepaticum* (Linnaeus) of Dujardin, 1845; *Fasciolaria hepatica* (Linnaeus) anonymous, 1845; *Distomum hepaticum* (Linnaeus) Diesing, 1850; *Distomum* (*Fasciola*) *hepaticum* Linnaeus of Leuckart, 1863; *Cladocoelium hepaticum* (Linnaeus) Stossich, 1892.

BIBLIOGRAPHY.—For bibliography, see Hassall (1894) and Huber (1894). For more technical discussion of species, see Leuckart (1889, pp. 179-328).

GEOGRAPHICAL DISTRIBUTION.—Cosmopolitan.

HOSTS.—Man, cattle, sheep, swine, and other animals. (See pp. 137-143.)

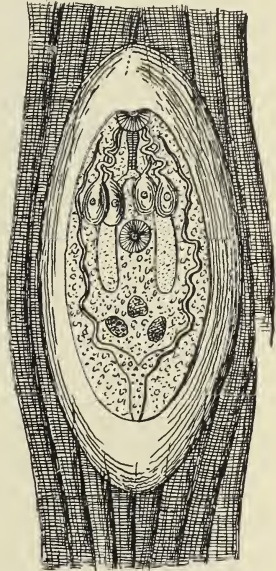


FIG. 1.—The Muscle Fluke (*Agamodistomum suis*), occasionally found in the muscle of swine. (After Leuckart, 1889, p. 155, fig. 86.)

<sup>1</sup> For a discussion of these forms, see Stiles, 1894-1895.



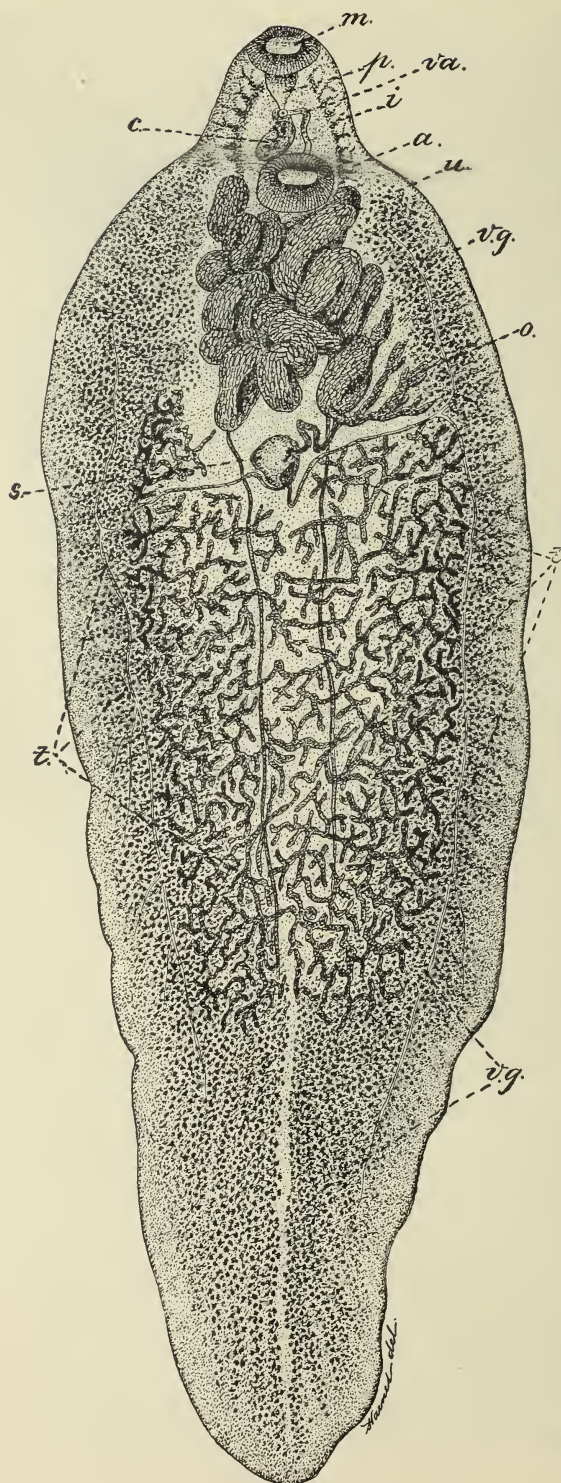


FIG. 3.—The Common Liver Fluke (*Fasciola hepatica*), enlarged to show the anatomical characters: *m.*, mouth with oral sucker; *p.*, pharynx; *va.*, vagina; *u.*, uterus; *vg.*, profusely branched vitellogene gland. (After Stiles, 1894, p. 300.)

**Lifeshistory.**—The life cycle of this fluke, as determined by the investigations of Creplin (1837), Weinland, Leuckart (1863, 1879, 1880, 1881, 1882), and Thomas (1882, 1883), is exceedingly interesting; at the same time it is very complicated, for the adult parasite, instead of producing young similar to itself and capable of developing directly into adults in cattle, produces eggs which develop into organisms totally different from the adult form living a parasitic life in other animals. In scientific language, the parasite is subject to an alternation of generations, together with a change of hosts. The following summary of the life history will make this point clear:

(a) The adult hermaphroditic worm (figs. 2 and 3), the characters of which are given on p. 22, fertilizes itself (although a cross fertilization of two individuals is not impossible) in the biliary

passages of the liver, and produces a large number (estimated at 37,000 to 45,000) of eggs.

(b) *Eggs* (figs. 4 and 5).—Each egg is composed of the following parts: (1) A true germ cell, which originates in the ovary and is destined to give rise to the future embryo; (2) a number of vitelline or yolk cells, which are formed in a specialized and independent portion (vitellogene gland) of the female glands; **instead of developing** into embryos, the yolk cells form a follicle-like covering for the true germ cell and play an important rôle in the **nutrition of the latter** as it undergoes further development; (3) a shell **surrounding** the germ cell and vitelline cells, and provided at one end with a cap or operculum. The eggs escape from the uterus of the adult through the vulva, are carried to the intestine of the host with the bile, then pass through the intestines with the contents of the latter, and are expelled from the host with the faecal

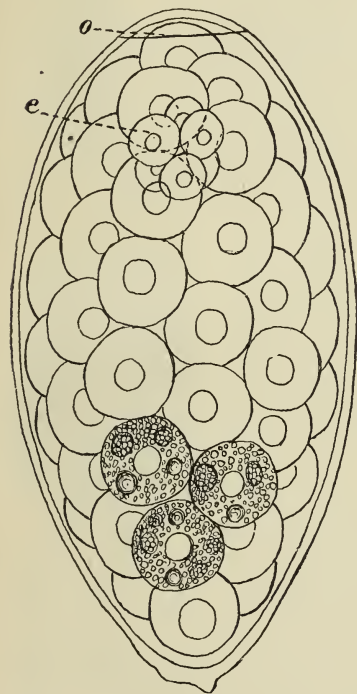


FIG. 4.—Egg of the Common Liver Fluke (*Fasciola hepatica*) examined shortly after it was taken from the liver of a sheep; at one end is seen the lid or operculum, *o*; near it is the segmenting ovum, *e*; the rest of the space is occupied by yolk cells which serve as food; all are granular, but only three are thus drawn.  $\times 680$ . (After Thomas, 1883, p. 281, fig. 1.)

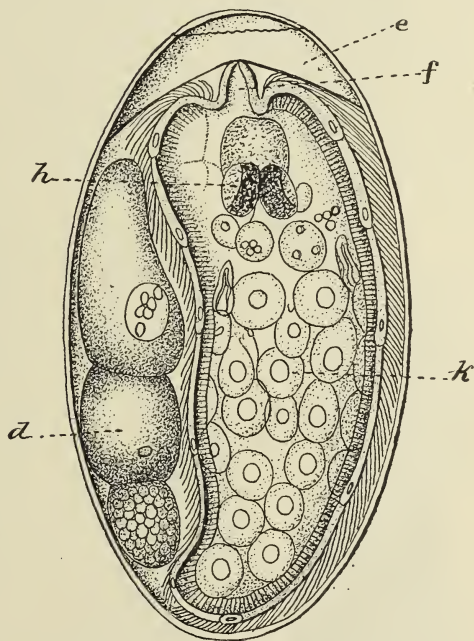


FIG. 5.—Egg of the Common Liver Fluke containing a ciliated embryo (miracidium) ready to hatch out: *a*, remains of food; *e*, cushion of jelly-like substance; *f*, boring papilla; *h*, eye-spots; *k*, germinal cells.  $\times 680$ . (After Thomas, 1883, p. 283, fig. 2.)

matter. Many of them become dried and then undergo no further development, but others are naturally dropped in the water in marshes, or, being dropped on dry ground, they are washed into the water by the rain, or are carried to a more favorable position by the feet of animals pasturing or passing through the fields. After a longer or shorter period of incubation, which varies with the temperature, a ciliated embryo (*miracidium*) is developed. At a temperature of  $20^{\circ}$  to  $26^{\circ}$  C. the miracidium may be formed in 10 days to 3 weeks; at a temperature of  $16^{\circ}$  C. the development takes 2 to 3 months; at  $38^{\circ}$  C. it ceases entirely. Experiments have



shown that as long as these eggs remain in the dark the miracidium will not escape from the eggshell; accordingly it will not escape during the night. When exposed to the light, however, or when suddenly brought into contact with cold water, the organism bursts the cap from the eggshell, crawls through the opening, and becomes a—

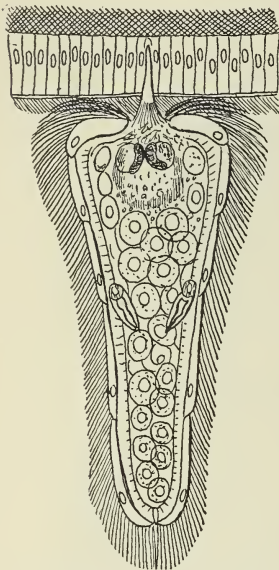


FIG. 6.—Embryo of the Common Liver Fluke (*Fasciola hepatica*) boring into a snail.  $\times 370$ . (After Thomas, 1883, p. 285, fig. 4.)

feelers, head, foot, or other exterior soft portion of the body of the snail; some of the parasites enter the pallial (lung) cavity and attach themselves there. After becoming securely fastened to the snail the miracidium discards its ciliated covering and shortens to about half its former length (0.07 mm. to 0.08 mm.). The parasites now bore their way into the body of the snail and come to rest in the liver, or near the roof of the pallial cavity, etc., the movements gradually cease, and we have before us the stage known as the—

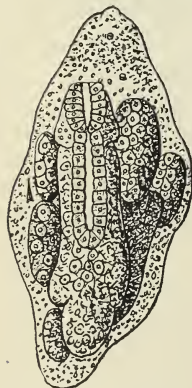


FIG. 8.—Sporocyst of the Common Liver Fluke, somewhat older than that of fig. 7, in which the germinal cells are giving rise to rediae.  $\times 200$ . (After Leuckart, 1889, p. 109, fig. 67 C.)

(c) *Free-swimming ciliated miracidium* (fig. 6).—As already stated, this organism is entirely different from its mother. It measures about 0.15 mm. long; it is somewhat broader in its anterior portion than in its posterior portion; on its anterior extremity we find a small eminence known as a boring papilla; the exterior surface of the young worm is covered with numerous cilia, which by their motion propel the animal through the water; inside the body we find in the anterior portion a simple vestigial intestine and a double ganglionic mass, provided with a peculiar pigmented double cup-shaped eye-spot; in the posterior portion of the body cavity are found a number of germ cells, which develop into individuals of the next generation.

Swimming around in the water, the miracidium seeks out certain snails (*Limnaea truncatula*, *L. oahuensis*, *L. rubella*, see p. 43), which it immediately attacks (fig. 6). The miracidium elongates its papilla and fastens itself to the

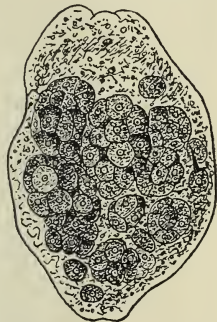


FIG. 7.—Sporocyst of the Common Liver Fluke which has developed from the embryo, and contains germinal cells.  $\times 200$ . (After Leuckart, 1889, p. 109, fig. 67 B.)

(d) *Sporocyst* (figs. 7 and 8).—The eye-spots, ganglionic swellings, and vestigial intestine become more and more indistinct and are finally lost. The sporocyst grows slowly at first, then more rapidly, and at the end of 14 days or so measures about 0.5 mm. The germ cells mentioned as existing in the posterior portion of the miracidium now develop into individuals of a third generation, known as—

(e) *Rediae* (figs. 9 and 10).—The rediae escape from the sporocyst when the latter are from two weeks (in summer) to four weeks (in late fall) old. Upon leaving the body of the sporocyst they wander to the liver of the snail, where they grow to about 2 mm. long by 0.25 mm. broad. Each redia consists of a cephalic portion, which is extremely motile, and which is separated from

the rest of the young worm by a ridge; under the latter is situated an opening, through which the next generation (cercariae) escape. The posterior portion of the



worm is provided, at about the border of the third and the last fourths of the body, with two projections. There is a mouth with pharynx situated at the anterior extremity, the pharynx leading into a simple blind intestinal sac. The redia, as well as the sporocyst, may be looked upon as a female organism, and in its body cavity are found a number of germ cells, which develop into the individuals of the next generation, known as—

(f) *Cercariae* (figs. 11-13).—These organisms are quite similar to the adult parasites into which they later develop. The body is flat, more or less oval, and provided with a tail inserted at the posterior extremity. The oral sucker and acetabulum are present as in the adult, but the intestinal tract is very simple; on the sides of the body are seen two large glands, but the complicated genital organs of the adult are not visible. The cercaria leaves the redia through the birth opening, remains in the snail for a longer or shorter time, or passes out of the body of the snail and swims around in the water. After a time it attaches itself to a blade of grass (fig. 12) or some other object, and forms a cyst around itself with material from the large glands, at the same time losing its tail. It now remains quiet until swallowed by some animal. Then, upon arriving in

FIG. 9.—Redia of the Common Liver Fluke (*Fasciola hepatica*), containing germinal cells which are developing into cercariae.  $\times 150$ . (After Leuckart, 1889, p. 269, fig. 129 A.)

the stomach—of a steer, for instance—the cyst is destroyed, and the young parasite wanders through the gall ducts or,

as some believe, through the portal veins to the liver, where it develops into the adult hermaphrodite.

From the above we see that this parasite runs through three generations, namely:

- (1) Ovum, miracidium, and sporocyst... first generation.
- (2) Redia... second generation.
- (3) Cercaria and adult... third generation.

During this curious development, which lasts about 10 to 12 weeks, there is a constant potential increase in the number of individuals, for each sporocyst may give rise to several (5 to 8) rediae, each redia to a larger number (12 to 20) cercariae, and each adult to an enormous number (37,000 to 45,000) of eggs. This unusual fertility of the animal is necessary because of the complicated life history and the comparatively small chance any one egg has of completing the entire cycle.



FIG. 10.—Redia of the Common Liver Fluke, with developed cercariae.  $\times 150$ . (After Leuckart, 1889, p. 270, fig. 130.)



FIG. 11.—Free cercaria of the Common Liver Fluke, showing two suckers, intestine, large glands, and tail. (After Leuckart, 1889, p. 279, fig. 137.)

*Hosts.*—An interesting and, from an agricultural standpoint, an important matter connected with this fluke is that it is found in a large number (about 25) of domesticated and wild animals, and this fact probably explains to some degree the wide geographical distribution of the parasite.

#### THE EFFECTS OF THE COMMON LIVER FLUKE UPON CATTLE, SHEEP, AND SWINE.

This worm is one of the most important and dangerous parasites with which the stock raiser has to deal, since it produces a disease which often results in heavy loss of live stock, especially of sheep. Although it does not seem as yet to have caused any such serious epizootics in this country as have been reported in Europe, sweeping out or greatly retarding the live-stock industry, we should not wait until such an occasion arises before we consider the importance of this subject. We know that *F. hepatica* is present in the country; furthermore, that it is common in some places (Texas and elsewhere), and we would do well to inquire into the injury which other countries have sustained as a warning that we must not totally ignore its presence among us.

The following are among the most important outbreaks<sup>1</sup> recorded:

Wernicke (1886) records that not less than 1,000,000 sheep died of fluke disease in the southerly provinces of Buenos Ayres during 1882; in 1886 more than 100,000 head died in Tandil during eight months.

Yonatt estimated the annual loss in Great Britain at 1,000,000 sheep. For 1879 and 1880, a loss of 3,000,000 head per year was estimated for England alone.

During 1876, Slavonia lost 40 per cent of her cattle from distomatosis.

In 1830, England lost 3,000,000 sheep from this disease, estimated at a value of \$20,000,000.

In 1829 and 1830, 5,000 of the 25,000 cattle of Montmédy perished; in Verdun, 2,200 cattle and nearly 20,000 sheep, out of 20,000 cattle and 50,000 sheep, succumbed to the parasite.

*Names of the disease.*—The presence of these flukes in the liver of animals gives rise to a disease known under the various names of rot, liver-rot, rot-dropsy, fluke disease, aqueous cachexia, cachexia aquosa verminosa, fascioliasis, distomatosis, etc.

The term *rot*, as used by farmers and by some veterinarians, is an exceedingly broad one; in many parts of this country almost any disease of sheep is called rot. We have met nodular disease of the intestine and other diseases under this term. On this account it must not be supposed that every article on rot refers to liver-fluke disease.

*Symptoms.*—There is no one special symptom which is characteristic of this disease and absent from all others; in fact liver rot in its various stages might easily be mistaken for other parasitic complaints.

(A) *The disease in sheep.*—Gerlach has divided the malady into four periods, and although this division is more or less artificial, since the different stages gradate imperceptibly into each other and are obscured

<sup>1</sup> For a more complete list of epizootics, see Hassall, 1894.

on account of the constant liability to further infection, we give Gerlach's scheme here as a convenient diagram of the disease:

These symptoms are taken chiefly from sheep, but the same description applies in a general manner to the same disease in other animals:

(1) *Period of immigration* (stage of traumatic hepatic inflammation, inflammatory swelling of the liver).—July to September, lasting about 13 weeks. This is the period of infection, but as the symptoms are not generally very pronounced (the pathological lesions produced by the flukes not having as yet affected the system of the host) it generally escapes notice. At first a redness of the eyes, which, however, soon disappears; paleness. Death from apoplexy sometimes occurs. The presence of the flukes in the liver irritates this organ and causes an increased blood supply (hyperaemia) and consequent enlargement of the liver. The surface is smooth, marked with small openings, out of which may be pressed a

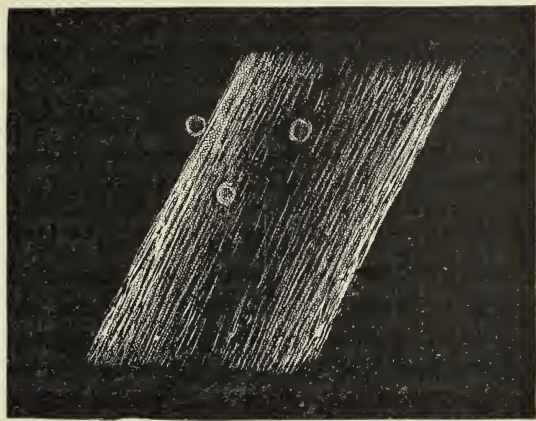


FIG. 12.—Portion of a grass stalk with three encapsuled cercariae of the Common Liver Fluke (*Fasciola hepatica*).  $\times 10$ . (After Thomas, 1883, p. 291, fig. 13.)

bloody serum, and around these openings there is frequently an inflammation of the peritoneum (localized peritonitis). Gall ducts still about normal; gall more or less bloody; hemorrhagic centers in parenchyma; bloody serous exudate in abdominal cavity, in which flukes are occasionally found. No eggs present as yet in droppings.

(2) *Period of anaemia*.—September to December, 6 to 12 weeks. The visible mucous membranes (around the eyes, nose, and gums) and the skin are paler than usual. Animals have a tendency to fatten. Appetite may be very good, but afterwards diminishes and rumination becomes irregular; slight oedema; bare skin soft to the touch, loose and pasty; eyes become "fat," i. e., they are partially closed, the conjunctiva becoming puffy; gradual loss of strength; fever and accelerated respiration; death in this stage seldom.



FIG. 13.—Isolated encysted cercaria of the Common Liver Fluke.  $\times 150$ . (After Leuckart, 1889, p. 286, fig. 142.)

Liver pale, increased considerably in size, especially in thickness; its capsule rough, opaque; its parenchyma soft with an appearance like porphyry, with hemorrhagic centers; here and there channels caused by parasites; numerous eggs in faeces.

(3) *Period of emaciation* (stage of atrophy of the liver).—January to May. Disease is at its height; extreme anaemia and emaciation; respiration feeble and quickened; temperature variable; abortions frequent; "puffiness" (oedema) especially frequent under the jaws; mortality high.

Atrophy of liver in various stages; gall ducts greatly thickened, frequently with calcareous incrustations; petechiae beneath endocardium; bile thick, dirty brown, with numerous eggs.

(4) *Period of emigration of the flukes*.—May to July. The flukes leave the liver and are passed with the droppings. The symptoms diminish, but the scars, the result of the inflammatory processes, remain.



Ziündel makes a slightly different division of the periods of the disease, but, as in the division proposed by Gerlach, it is not to be followed too rigidly, as the different periods are not sharply defined from one another. Ziündel's four periods are:

*First period.*—Stage of inflammation, inflammatory swelling of the liver: August to October. The presence of the flukes causes an irritation; profuse flow of gall mixed with blood. Generally passes unnoticed.

*Second period.*—Stage of contraction of the liver: September to November, 6 to 12 weeks. Flukes collected in groups partially obstruct the bile ducts, whose irritated mucosa is thickened; anaemia, cachexia, general weakness, discoloration of the tissues.

*Third period.*—Stage of atrophy of the liver: January to March. Cachexia; high mortality. Flukes mature; gall ducts greatly thickened and hardened. Liver atrophies in some places, swells in others.

*Fourth period.*—Stage in which the flukes leave the liver: April to June.

(B) *The disease in cattle.*—The first symptoms are generally overlooked, the disease not attracting attention until the appetite is diminished, rumination becomes irregular, the animals become hidebound, and the coat dull and staring. The staring coat is due to the contraction of the muscles of the hair follicles. The visible mucous membranes become pale, eyes become dull, there is running at the eyes, and the animal gradually becomes emaciated. As the disease advances the milk supply is lessened, fever appears, there is generally great thirst, but the appetite almost ceases; oedematous swellings appear on the belly, breast, etc.; diarrhoea at first alternates with constipation, but finally becomes continuous. The disease lasts from 2 to 5 months, when the most extreme cases succumb.

Ostertag (1895, p. 357) states that most of the European cattle are infested with liver flukes, but that even when a large number are present the nourishment of the cattle is not disturbed. Thickening of the gall ducts, so that a so-called "Medusa's head" forms on the surface of the liver toward the stomach, appears in even well-nourished animals; even in cases of a cirrhosis of the liver it is seldom that any effect upon the cattle's health can be noticed, and as long as a portion of the liver tissue, about twice the size of the fist, remains intact the nourishment of the animal may be comparatively good. Ostertag, in all of his experience, has never seen a generalized oedema in slaughtered cattle as a result of fluke invasion, and even in the heaviest infections of young cattle he has noticed only emaciation.

(C) *The disease in hogs.*—The Common Liver Fluke is a comparatively rare parasite in swine and apparently of very little importance.

*Pathology.*—The pathological lesions are directly dependent upon the presence of the flukes in the body, and as the liver is the chief abode of the parasites, we should accordingly expect to find that this organ is more affected than any other, and the seat of the primary lesions; also that the symptoms and changes noticed in other organs are in nearly all cases directly dependent upon the changes in the liver; furthermore,



that the extent of the lesions is dependent upon the number of parasites present. The size of the worms and the size of the spines found on them are two important factors in determining the extent of the lesions.

By their presence and wanderings in the gall ducts the parasites irritate the mucosa and cause an inflammation accompanied by an increased secretion, leading to a desquamative catarrh; this inflammation causes a thickening of the mucosa with growth of its glandular elements (glandular hyperplasia) and submucosa. The young parasites make their way into the smaller ducts, rolling their body dorsally and here singly, or in the larger ducts in groups, they cause a dilatation of the ducts, in some cases forming cysts. There is a hyperplasia of the connective tissue



FIG. 14.—Drawing from a microscopic preparation showing a hemorrhage in the parenchyma of the liver caused by the Common Liver Fluke (*Fasciola hepatica*): a, atrophic liver tissue; b, round cell infiltration; c, a portion of the parasite; d, hemorrhage. (After Schaper, 1890, Pl. I, fig. 1.)

and a cellular infiltration, together with an increased development of the blood capillaries. The inflammatory process extends from the duct walls to the interlobular connective tissue, accompanied by atrophy of the parenchyma. A slight atrophy of the parenchyma, with an extensive hypertrophy of the connective tissue and an extensive infiltration and increased blood supply, naturally causes an increase in the size of the liver. With the decrease of the hyperplastic tissue and the consequent compression and destruction of the capillaries the cirrhotic and atrophic processes become evident. An advancing hyperplasia of the connective tissue destroys the parenchymatic cells of the lobules, leaving in many cases only a clump of gall pigment as evidence of a former lobule. Gradually a smaller or larger portion of the liver is changed into a mass of cicatricial tissue surrounding stiff tubes—the metamorphosed gall ducts.

Besides the lesions thus far described, due for the most part to the changes in the gall ducts, other changes are found due directly to the action of the parasites upon the parenchyma of the liver, namely, a breaking down of the liver tissue, paren-

chymatic hemorrhages, pus infiltrations, and abscess formations. The flukes may break through a smaller gall duct, or may penetrate one of the larger ducts at a weak point, and wander directly through the soft glandular tissue; the mechanical injury to the tissue results in its necrosis; blood vessels are also injured, giving rise to multiple hemorrhages, which may discharge through the gall ducts and aid in producing the general anaemia. Inflammation naturally follows the flukes in their wanderings, leading to a liquefaction of the tissue and formation of abscesses, in which bacteria (streptococci and staphylococci) are found, the organisms having come from the inflamed bile ducts. With this inflammation going on it is but natural that the walls of some of the blood vessels should be affected, thus making it possible for the flukes to gain access to the circulation, with which they might be

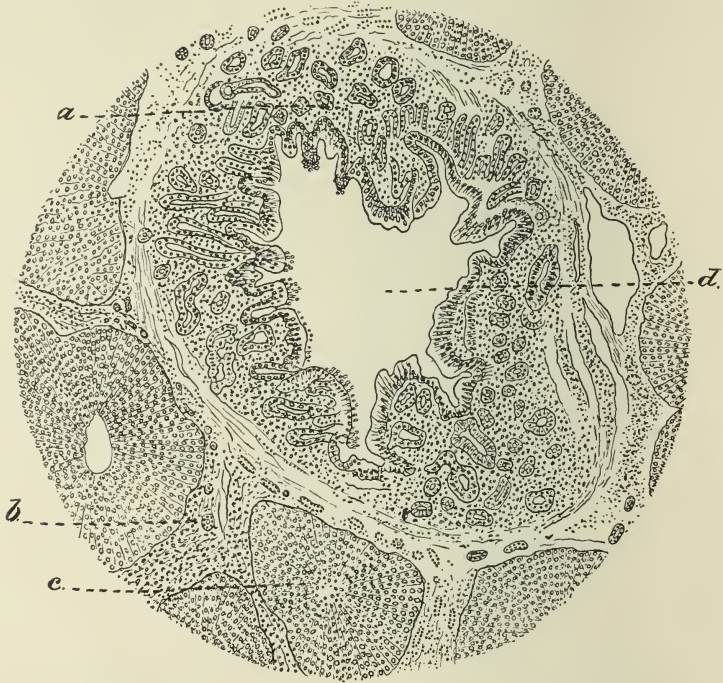


FIG. 15.—Drawing from a microscopic preparation showing the glandular hyperplasia of the mucosa of a gall duct caused by the Common Liver Fluke (*Fasciola hepatica*): *a*, hypertrophied submucosa; *b*, interstitial connective tissue; *c*, compressed lobule; *d*, lumen of the gall duct; thickened fibrous wall of the gall duct. (After Schaper, 1890, Pl. I, fig. 2.)

carried to various parts of the body, lungs, brain, etc., causing endophlebitis, endarteritis, ruptures, thrombosis, emboli, abscesses, etc.; pyaemic or septicopyaemic processes may extend from the liver, and finally the flukes in their wanderings may perforate the capsule of the liver, causing perihepatitis or peritonitis.

These various pathological lesions naturally act upon the circulatory system. The branches of the portal veins and vena cava are compressed or obliterated to a certain extent, and ascites and oedema follow.

The bile is greatly changed, becoming more or less thick, greenish brown, or dirty red, and containing epithelial, parenchymatic, and blood cells, leucocytes, bacteria, fluke eggs, etc., according to the processes going on in the liver.

The hemorrhages, lack of sufficient gall, consequent disorder in digestion, pathological changes, etc., rapidly lead to a general cachexia, weakness, and emaciation.



In animals infested with flukes it has been noticed that the blood is poor in haemoglobin and that the number of blood corpuscles is below the normal.

For a more detailed discussion, see Schaper (1890).

As already stated, the symptoms and pathology here given are based chiefly upon observations made on sheep, but what has been said of the disease in sheep may also be said of the disease in cattle, except that the latter, on account of their greater strength, can better withstand the attack, and the symptoms are accordingly not so marked.

*Diagnosis.*—Flukes are said to be found in the faecal matter during the fourth stage, but their eggs may be found much earlier. Accordingly, if fluke disease is suspected a positive diagnosis may be made by

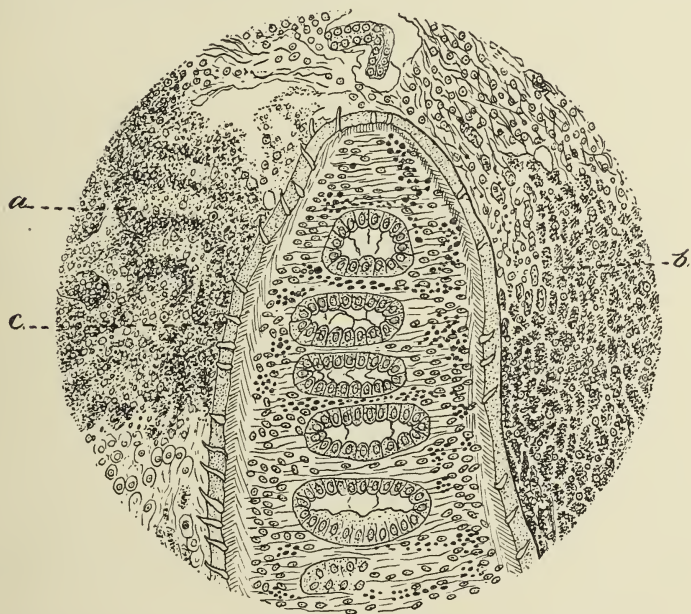


FIG. 16.—Drawing from a microscopic preparation showing a fluke in the tissue of the liver: *a*, necrotic liver tissue; *b*, atrophic liver cells; *c*, spines on the fluke, showing the outline of the body. (After Schaper, 1890, Pl. III, fig. 5.)

a microscopic examination of the faeces to find the ova. In order to do this it is often sufficient to place a minute portion of faecal matter on a slide, add a drop of water, and examine under a low-power lens.

An easy method of concentrating the eggs in a given amount of manure to be examined, so that the microscopic examination will be facilitated, is to place the faecal matter in a jar of water, shake well, filter through a wire net, and allow it to settle. The fluke eggs will settle on the bottom with the heavier matter, but a great deal of vegetable material will be caught by the wire netting or will float. The part which floats can then be drained off with water, leaving the eggs in the more solid matter, which can then be examined microscopically.

If facilities for a microscopic examination are not at hand, it is best to sacrifice one of the animals of the herd—the one in which the symptoms are most pronounced—and examine its liver for flukes.

*Position of the parasites.*—For the most part the flukes are confined to the gall ducts; some, however, are found in the parenchyma of the liver; a few reach the portal veins and cause endophlebitis, thrombosis, and emboli; others enter the liver veins and are carried to various parts of the body; upon passing the heart they reach the lungs, where they can give rise to hemorrhagic centers, canals with bloody contents, or even nodules. From the pulmonary arteries they could reach the pulmonary veins, and from there may be carried by the blood to any part of the body. The presence of flukes in peripheral portions of the body is, however, exceptional.

*Influence of age.*—It has been noticed in epizootics that calves and cattle under three years are more seriously affected by the disease than are older animals. This is undoubtedly due to the fact that the older animals are stronger, and hence are able to resist more.

It has, however, been shown that very young calves are comparatively rarely infested with flukes (see fig. 17); a fact which is easily understood when we recall that they are, from their mode of life, food, etc., less exposed to the infection than the older animals, which live almost entirely upon pasture, and, taking in a great amount of grass, naturally stand in danger of swallowing a greater number of the cercariae. Bulls which are kept close are generally free from these worms.

*Geographical distribution; fluky years and fluky seasons.*—This parasite has a very wide distribution, being found in Europe, Asia, Africa, North America, and South America. As a general rule, it can be said that the parasite is found on the lowlands—marshes, valleys, etc.—but is generally absent from the highlands; and this is in accordance with the facts observed in connection with the life history, for the intermediate host is a snail which lives in marshes and marshy districts, but is generally absent from the dry highlands. With this same general law of distribution, dependent upon the physical geography of the country, we can correlate two other general statements in regard to the occurrence of the parasite, and hence of the disease, based upon the humidity of the season—namely, fluke disease is more frequent in wet years (“fluky years”) than in dry years, and fluke disease is more prevalent after the wet months of the year than after the dry months.

In wet years, namely, in years of heavy rainfall, the overflow of water naturally extends the limits of marshes and carries the snails over a greater area. Furthermore, the ground being more moist, the eggs have greater chances for development, and the infection is thus spread.

An idea of the frequency of the parasites during different months of the year may be obtained from an examination of fig. 17. On this chart Leuckart has plotted the animals slaughtered at the Berlin abattoirs during the years 1883–84, according to statistics furnished by Hertwig. The table covers 94,387 head of cattle and 77,848 calves. Of the cattle,



about three-fourths to four-fifths were infested with flukes, and of these 3,428 were so badly infested that their livers were condemned. Of the calves, only 154 livers were condemned.

The table shows us that the parasites are present the entire year; also that there are two periods during the year, namely, from October to January (highest in October) and from March to April, in which the

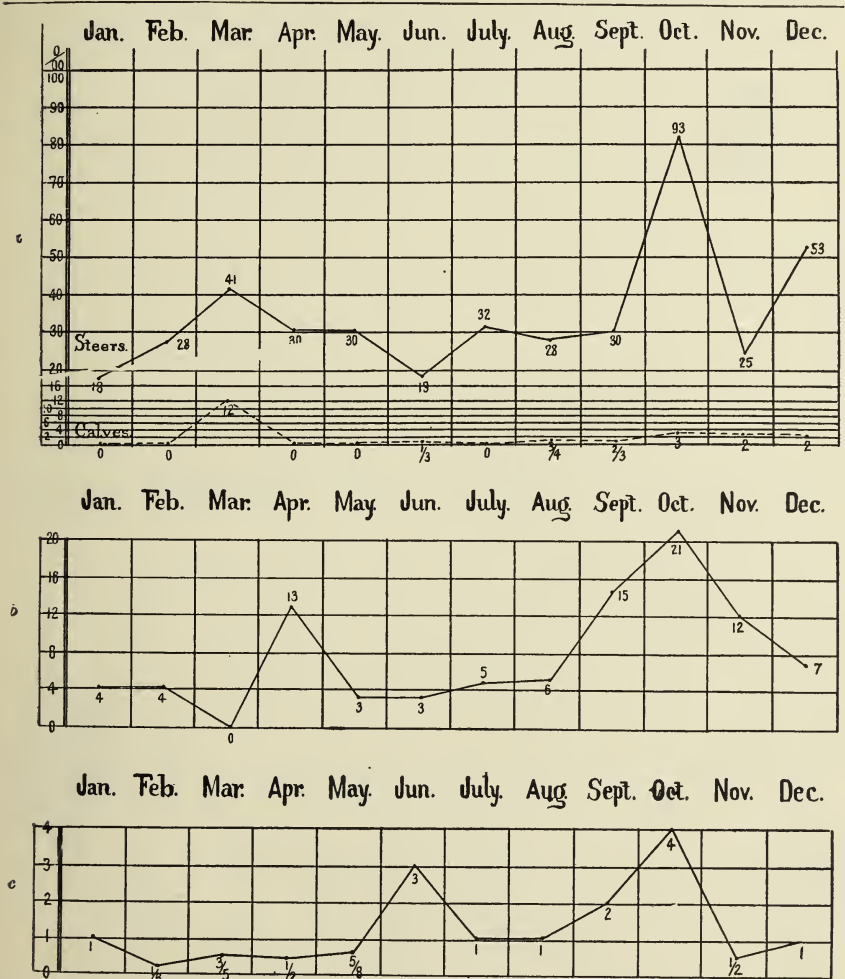


FIG. 17.—Tabular diagram of the occurrence of the Common Liver Fluke (*Fasciola hepatica*) during different months of the year: a, cattle; b, sheep; c, swine. (After Leuckart, 1889, p. 301, fig. 147.)

livers are particularly infested, or so altered as not to be fit for food. Leuckart has interpreted these figures as signifying that the winter maximum pointed to an infection in the fall, while the summer maximum pointed to one in early spring, namely, during the wettest seasons of the year.

According to Lutz (1892), Oahu and Kauai of the Sandwich Islands suffer considerably from fascioliasis. In some parts of Oahu nearly all the cattle have been destroyed by the disease; the sheep from dry districts, however, are not affected. Of 602 calves examined at Honolulu, 298 were found infested; of 2,186 cattle, 1,313 were infested, so that about four-sevenths of the animals were diseased.

In this country we have no exact statistics covering this parasite, but Francis, in writing upon the presence of the worm in Texas, states "that it is exceptional to find a liver free from them at any time of the year, and especially so during the spring;" also, that "heifers coming 2 years old suffered more than at any other age. Many of the cattle and sheep die, and many of those that recover do not thrive the following summer, but remain poor and weak and fail to breed."



FIG. 18.—*Limnaea truncatula*, natural size and enlarged. (After Leuckart.)

Most American authors (Hassall and Francis excepted) have failed to recognize the difference between this species and *F. magna*, so it is in many cases impossible to determine whether an author had before him *F. hepatica* or *F. magna*, or both species, and on this account it is impossible to give the exact distribution of the worms in this country. That it is common in Texas is shown by Francis' article, and I have found the same parasite quite common (August, 1893) in Texan cattle slaughtered at Chicago. I have also found it in other than Texas cattle, although I can not state where the animals came from. Law records *F. hepatica* from sheep on Long Island. Curtice is of the opinion that *F. hepatica* is rare in the United States, but says that in sheep it is "reported by sheep books and newspaper articles."

*Time of infection.*—Gerlach supposed that the infection takes place only in summer and fall, but the diagram (fig. 17) does not support his view. Furthermore, young flukes have been found in February, pointing to an infection in January. Nevertheless, the general rule will hold true that in a temperate climate the time of greatest danger of infection is during the summer and early fall.

That the danger of infection gradually decreases in the fall and winter is shown by the interesting observation of Thomas that in winter the rediae produce other rediae instead of cercariae, and that fluke disease is more fatal to snails than to mammals, so that as the season advances the number of cercariae in the fields must reach its maximum and then gradually decrease.

In a warm and moist climate the conditions favorable to infection will naturally persist longer than in a cold and dry climate.

*Source of infection.*—The snails<sup>1</sup> which form the intermediate host of this parasite must, because of the transmission of fluke disease, be included among the worst enemies of the stock raiser.



FIG. 19.—*Limnaea peregra*, natural size and enlarged. (After Leuckart.)

<sup>1</sup> For a more detailed account, see Stiles, 1894-95, pp. 303-313.

Leuckart and Thomas experimentally demonstrated the truth of Weinland's view, that in Europe the intermediate host for this fluke is a small swamp snail (*Limnaea truncatula*). Leuckart also showed that the rediae (but not the cercariae) would develop in the young of another species of snail (*L. peregra*), and quite recently Lutz (1892 and 1893) has shown that in Oahu and Kauai (Sandwich Islands) two other snails may serve in this capacity (*L. oahuensis* Souleyet and *L. rubella* Lea). In the case of *L. oahuensis*, Lutz states that "the infection can take place only in young specimens." None of these four very closely allied species are recorded for America, and yet we find *F. hepatica* in both North America and South America, so that we must either have on this continent some other species of snail which may act as intermediate host, or some of the species described in America must be identical with some of the above-named forms.

The forms which would especially fall under suspicion are *L. humilis* Say, in North America, and *L. viator* Orb., in South America.



FIG. 21.—*Limnaea oahuensis*, natural size and enlarged. (After Souleyet.)

that is a matter for conchologists to decide. Suffice it to say that specialists in conchology have described snails under these names; that the forms are all so very closely related that a zoologist would not commit a very grave offense against systematic zoology if he were to consider them as varieties of two or three species; that the forms described under the names *L. truncatula*, *L. oahuensis*, and *L. rubella* are known to serve as intermediate hosts for the parasite now under discussion; that in Europe the rediae (but not the cercariae) develop in *L. peregra*, and that it is probable, though not demonstrated as yet, that *L. humilis* is intermediate host for North America and *L. viator* for South America.

**Treatment.**—Hygiene must play a much more important rôle in the treatment of this disease than therapeutics, for while the knowledge of the life history of the parasite shows us how we may to a certain extent prevent the disease, no drug is known which can be relied upon to kill the flukes or dislodge them from their habitat. A great many drugs have been tried in the hope of accomplishing this end, but although some authors recommend the use of anthelmintics, most writers admit that such drugs are practically useless in this disease,

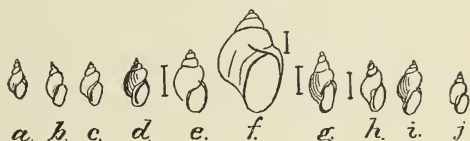


FIG. 20.—*Limnaea humilis*, natural size and enlarged. (After Binney.)

This report is not the place to discuss the question as to whether these forms (*L. truncatula*, *L. peregra*, *L. oahuensis*, *L. rubella*, *L. humilis*, and *L. viator*) represent six well-established species or not, as



FIG. 22.—*Limnaea viator*, natural size and enlarged. (After d'Orbigny.)

and that the only treatment practicable is to use stimulants and tonics (various iron salts, walnut leaves, pepper in alcoholic drinks, calamus, etc.), with good nourishing food, such as lupine seeds, lupine hay, roasted malt, linseed cakes, oats, bran, etc., rich in protein, in order to build up the system and carry the animal through to the fourth stage of the disease, when the flukes will die or, as some authorities state, wander out spontaneously; and, in case the pathological lesions are not too great, the live stock will have an opportunity to recover. Many authors recommend astringents and diuretics (salt, juniper berries, turpentine, etc.) to meet the hydropic complications.

The following are some of the formulæ given by various authors for fascioliasis in sheep, and the same medicaments may be used for this disease in cattle:

(1) The following is advised by Delafond. Make into a paste with water and allow to ferment, then bake in an oven. Give morning and evening. In about fifteen days this bread is said to produce improvement.

Mixture.	Metric.	Approximate equivalents.		
		Avoirdupois.	Apothecaries'.	Imperial troy.
Undressed wheat meal.	1 kilogram..	2½ pounds.....	2.7 pounds.....	2.7 pounds.
Oatmeal .....	2 kilograms..	4½ pounds.....	5.3 pounds.....	5.3 pounds.
Barley meal .....	1 kilogram..	2½ pounds.....	2.7 pounds.....	2.7 pounds.
Sulphate of iron....	30 grams....	1 ounce 25 grains ..	463 grains.....	463 grains.
Carbonate of soda...	30 grams....	1 ounce 25 grains ..	463 grains.....	463 grains.
Table salt .....	200 grams....	7 ounces 24 grains ..	3,086 grains = 6½ ounces.	3,086 grains = 6½ ounces.

(2) The following is Hauber's lick for 100 sheep:

Mixture.	Metric.	Approximate equivalents.		
		Avoirdupois.	Apothecaries'.	Imperial troy.
Sulphate of iron....	60 grams....	2 ounces 50 grains ..	926 grains = 1.7 ounces.	926 grains = 1.7 ounces.
Calamus root .....	500 grams....	17 ounces 279 grains.	7,716 grains = 1 pound 4 ounces.	7,716 grains = 1 pound 4 ounces.
Crushed oats .....	20 liters ....	21½ quarts, U. S. ....	21½ quarts, U. S. ....	17½ quarts, imperial.
Roasted barley malt.	20 liters ....	21½ quarts, U. S. ....	21½ quarts, U. S. ....	17½ quarts, imperial.

(3) The following is Hauber's lick for 50 sheep:

Mixture.	Metric.	Approximate equivalents.		
		Avoirdupois.	Apothecaries'.	Imperial troy.
Sulphate of iron...	30 grams.	1 ounce 25 grains ..	463 grains.....	463 grains.
Powdered juniper berries.	500 grams.	17 ounces 279 grains.	7,716 grains = 1 pound 4 ounces.	7,716 grains = 1 pound 4 ounces.
Gentian.....	500 grams.	17 ounces 279 grains.	7,716 grains = 1 pound 4 ounces.	7,716 grains = 1 pound 4 ounces.
Grits .....	20 liters....	21½ quarts, U. S. ....	21½ quarts, U. S. ....	17½ quarts, imperial.

(4) The following lick for 300 sheep is highly indorsed by some authors, but not considered of much value by Zürn. A portion of this



mixture is given every other day for awhile, and then once every fourteen days through the summer.

Mixture.	Metric.	Approximate equivalents.	
		U. S. apothecaries', or wine measure.	Imperial troy.
Powdered lime .....	5 liters .....	5½ quarts .....	4¾ quarts.
Powdered table salt.....	10 liters .....	10½ quarts .....	8½ quarts.

(5) Mojkowski reports good results in treating sheep twice a day for a week with 0.7 to 1 gram (metric) of naphthaline (= 7.7 to 15½ grains apothecaries' or imperial troy).

(6) Ziirn suggests the following to be mixed and given to cattle in four doses in two days:

Mixture.	Metric.	Approximate equivalents.		
		Avoirdupois.	Apothecaries'.	Imperial troy.
Powdered wormwood..	90 grams..	3 ounces 76 grains..	1,389 grains = 2.89 ounces.	1,389 grains = 2.89 ounces.
Powdered calamus root	90 grams..	3 ounces 76 grains..	1,389 grains = 2.89 ounces.	1,389 grains = 2.89 ounces.
Sulphate of iron.....	15 grams..	½ ounce.....	231.5 grains.....	231.5 grains.

(7) Bunk advises 30 to 60 grams (= 1 ounce 25 grains to 2 ounces 50 grains avoirdupois = 463 to 926 grains apothecaries' or imperial troy) of benzine as a daily dose for each steer, to be given in mash.

The butcher's knife will be found a much more practicable means of treatment than any of the prescriptions given above, and the earlier in the disease that the animals are slaughtered the better condition they will be found in. In the early stages of the malady, as was seen above, there is a tendency on the part of the animals to fatten, due possibly to the increased flow of bile and the consequent acceleration in digestion, and, according to several authors, this fact has been taken advantage of by certain sheep dealers who have purposely exposed their flocks to fluke infection in order to fatten them early in the season.

In the case of cattle infected with *F. hepatica* it will scarcely be necessary to take such strenuous precautions as with sheep, for, as already stated, the disease is by no means as fatal to cattle as to sheep; in fact, in the vast majority of cases the presence of the parasites in cattle is not recognized until after the animals are slaughtered. This must not, however, be interpreted as meaning that the disease in cattle may be ignored, but merely that the disease in sheep must receive much more prompt attention than the disease in cattle.

If sheep are pastured in the same region as cattle, the presence of this parasite in cattle becomes doubly important, for in this case the disease will be spread to sheep and may cause heavy losses. Prompt measures to suppress the disease and isolation of the infested cattle should accordingly be resorted to.

*Preventive measures.*—For an excellent and more detailed account of the preventive measures, the reader is referred to Thomas (1883, pp. 296–305), of which the greater part of the following is a summary:

As seen from the life history of the parasite, four conditions are necessary for the propagation of this disease in any given district, namely: (1) The presence of fluke eggs; (2) wet ground, or water during the warmer weather, in which the eggs may hatch; (3) a snail (*L. truncatula*, or certain other species) which will serve as intermediate host; (4) herbivorous animals must be allowed to feed upon the infected pastures without proper precaution being taken to prevent infection. Destroy any one of these conditions and fluke disease will be destroyed; control any one of these conditions and the disease will be controlled in equal measure.

These conditions may be controlled or held in check by the following means:

(1) *To prevent the scattering of eggs in the fields:*

(a) In buying cattle or sheep, do not purchase any from a fluky herd, as they may introduce the disease to your farm.

(b) If animals are fluked, send those which are most affected to the butcher and place the others on dry ground.

(c) Destroy the livers of the slaughtered fluked animals, or if used as food for animals (dogs, etc.,) they should first be cooked in order to kill the eggs; if this precaution is not taken, the fresh eggs will pass through the intestine of the dogs uninjured and be scattered over fields.

(d) Manure of fluky animals should never be placed upon wet ground. It is, however, not dangerous to use such manure upon dry ground.

(e) “As rabbits and hares may introduce the disease into a district, or may keep up an infection if once introduced, these animals should be kept down as much as possible.” This is not always practicable.

(f) Where animals very heavily infested with flukes have pastured on a given piece of ground, some one should go over the field with a spade and spread out the patches of manure, so that it will dry more rapidly, and thus the eggs may be more quickly destroyed. A spade full of lime or dust will aid in drying up the manure patches.

(g) Manure of fluky animals should not be stored where it can drain into pastures.

(2) *To control the second condition, i. e., marshy ground:*

(a) The marshes should be drained, if possible, so that the snails may be gotten rid of.

(b) It has been noticed that sheep which pasture on salty marshes are not fluked; accordingly dressings of salt, to which lime may be added, should be spread over the pasture, as salt and lime will destroy the embryos, the encysted cercariae, and the snails. May to August are the best months for scattering these substances.

Lime will destroy the grass for immediate use, but will in some cases be advantageous to the soil. The farmer must decide for himself whether he should use salt alone or lime and salt.

(c) If the marshy ground can not be controlled, place the animals on higher ground.

(3) *To destroy the snail.*—This may be done by draining the fields, thus depriving the snails of the conditions necessary for their development, or by the free use of salt and lime.

(4) *General precautions to be taken:*

(a) It is known that salt will kill the cercariae; accordingly if salt is given to the animals they stand a better chance of escaping hepatic infection, even if the germs are swallowed, not only because this substance kills the young flukes, but because it aids the animals in their digestion. The following experiment is interesting in this connection:

A number of uninfected sheep were selected and divided into two flocks, then placed upon pasturage which was known to be infected. One flock received no special attention, while the sheep of the other flock were fed a quarter of an ounce of common salt well mixed with half a pint of oats every day that they were on the pastures; but when fed upon turnips, vetches, etc., the allowance of salt and corn [=oats] was not given. The first flock were so infected with flukes that they could not be kept through the winter, while the second flock was quite sound. The corn [=oats] and salt had cost about 3s. (75 cents) per head; the profit was about 50s. (\$12.50) per head.—T. P. HEATH, *Western Morning News*, October 14, 1882.

(b) A daily allowance of dry food should be given.

(c) If fields are overstocked the animals will be obliged to graze very close to the ground, and will thus be more liable to become infected; accordingly, in order to prevent this close grazing, fields should not be overstocked.

(d) Animals should not be left too long upon the same pasture.

(e) Raised watertanks should be placed in the pastures so that the herds will not be forced to drink from pools, etc. As it is difficult for snails to get into such drinking tanks, there will be little fear of infections from tanks of this sort.

#### ABATTOIR INSPECTION.

*Fluked animals as food.*—If only a few flukes are found in the liver and these have not caused any extensive pathological changes, there seems to be no valid reason for condemning the entire organ as food, for the eggs would be perfectly harmless if eaten; the adult parasites, if swallowed alive, might cause some temporary injury, but as liver is well cooked in this country, there is scarcely any chance that the adult worm would be swallowed alive; if the pathological change is confined to a portion of the liver, that portion can be cut out and the rest may be used for food; in case of a general cirrhosis, or in case of suppurating inflammation of the tissue, caused by the wandering of flukes through the same, the liver should be condemned to the tank. There is generally no particular alteration to be noticed in the flesh of fluked cattle, unless the livers are very far gone, in which case the meat is more “flabby” and lighter than usual. In the case of badly fluked sheep, the flesh is of a very poor quality and contains but little nour-

ishment; it is pale and "flabby," and according to European authors it should not be placed on the market in case the sheep have passed Gerlach's second stage of the disease.

#### JURISPRUDENCE.

In this country we have no general laws protecting a person in case he buys fluked animals. In Germany, Austria, and Switzerland certain laws protect the buyer, so that if fluke disease shows itself in a flock within a stated time after purchase the contract is void.

#### THE COMMON LIVER FLUKE IN MAN.

This parasite is rare in man, only about twenty cases being on record of its presence in the bile ducts. It is not at all impossible that the parasites described as *Hexathyridium venarum*, *Distomum oculi-humani* (*D. ophthalmobium*), and *Monostomum lentis* are young erratic liver flukes.

The fluke may produce serious trouble in man, which may result fatally.

#### VARIETIES OF THE COMMON LIVER FLUKE.

Several varieties of the Common Liver Fluke have been described by different authors, and although they have not yet been recorded in this country, they should be mentioned briefly in this report:



FIG. 23.—The Narrow Liver Fluke (*Fasciola hepatica angusta*), natural size (original, from one of the cotype specimens).

(a) THE NARROW LIVER FLUKE (*Fasciola hepatica angusta*) OF SENEGAL CATTLE AND MAN (?).

[Figs. 23 and 24.]

This variety has recently been described by Railliet (1895, p. 338) from specimens taken from cattle slaughtered at St. Louis, Senegal. Blanchard (1895, p. 733) thinks it identical with *Fasciola gigantica* (see p. 49) of the giraffe. He also considers it identical with a parasite expectorated by a French naval officer in Brazil and recorded by Gouvea (1895). See also the next variety.

(b) THE EGYPTIAN LIVER FLUKE (*Fasciola hepatica aegyptiaca*) OF BUFFALO AND CATTLE.

[Figs. 25 and 26.]

This parasite was originally described by Looss (1896, pp. 33-36, 192) as a variety of the common fluke, but he has recently written to us that he is now inclined to look upon it as a distinct species. He found the parasite in the liver of cattle (*Bos taurus*) and buffalo (*Bos bubalis*). Blanchard (1896, p. 733) evidently considers this form identical with both the narrow fluke (*F. hepatica angusta*) and the giant fluke (*F. gigantica*, p. 49).

(c) THE COMMON LIVER FLUKE (*Fasciola hepatica caviae*) OF GUINEA PIGS.

SYNONYMY.—*Distomum caviae* Sonsino, 1890; *Fasciola hepatica* var. *caviae* (Sonsino) Sonsino, 1896.

Sonsino described this parasite from the guinea pig as a distinct species, but he now believes it to be a variety of the Common Liver Fluke.





FIG. 24.—The Narrow Liver Fluke (*Fasciola hepatica angusta*), enlarged to show the anatomical characters: *a*, acetabulum; *t*, intestine; *m*, mouth with oral sucker; *o*, ovary; *p*, pharyngeal bulb; *s*, shell gland; *t*, profusely branched testicles; *u*, uterus; *va*, vagina; *vg*, profusely branched vitellogene glands. See p. 48.

### 3. The Giant Liver Fluke (*Fasciola gigantica*) of Giraffes, Cattle (?), and Man (?).

[Fig. 27.]

SYNONYMY.—*Fasciola gigantica* Cobbold, 1856; *Distomum giganteum* Diesing, 1858; *Distoma hepaticum* ex p. of Gervais and van Beneden, 1858; *Fasciola gigantea* Cobbold, 1859; *Cladocoelium giganteum* (Diesing) Stossich, 1892 ex. p.

BIBLIOGRAPHY.—For bibliography and technical discussion, see Stiles. 1894-95, pp. 139-143.

HOST.—Giraffe, cattle (?), and man (?). (See pp. 137-143.)

This parasite was described from specimens taken in England from a giraffe belonging to a traveling menagerie. Blanchard (1895, p. 733) believes it identical with the narrow fluke (p. 48) and evidently also with the Egyptian fluke (p. 48).



FIG. 25.—The Egyptian Liver Fluke (*Fasciola hepatica aegyptiaca*), drawn from one of Looss' specimens, natural size (original). See p. 48.

### 4. The Large American Fluke (*Fasciola magna*) of Cattle and Deer.

[Figs. 28-35].

For anatomical characters, compare figs. 29 and 30 with key, p. 21.

VERNACULAR NAMES.—English, *The Large American Fluke*, *The Grand Fluke*; German, *Der grosse amerikanische Leberegel*; French, *Grand Distome*; Italian, *Distoma grande*, *Distoma magno*.

SYNONYMY.—*Distomum magnum* Bassi, 1875; *Fasciola carnosus* Hassall, 1891; *F. americana* Hassall, 1891;

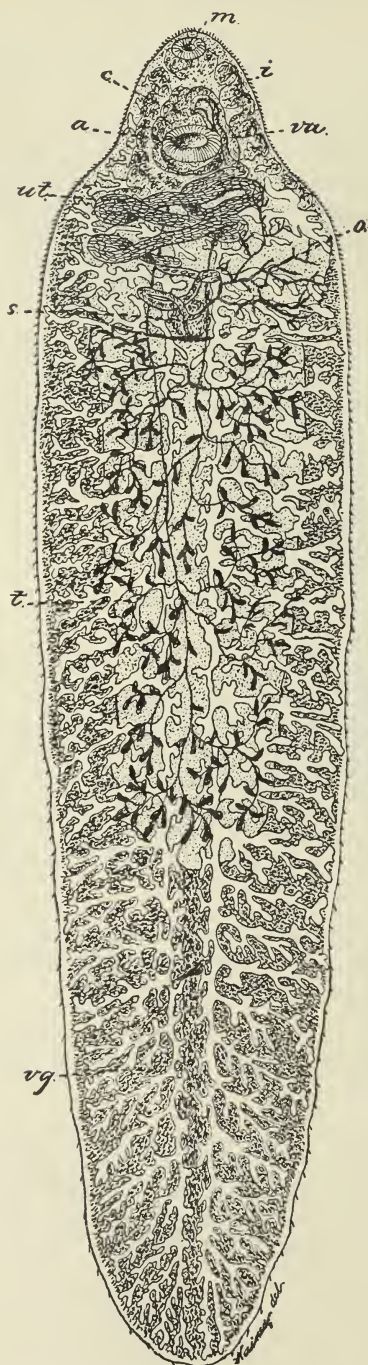


FIG. 26.—The Egyptian Liver Fluke (*Fasciola hepatica aegyptiaca*), enlarged to show the anatomical characters: *a*, acetabulum; *c*, cirrus pouch; *i*, intestine; *m*, mouth with oral sucker; *o*, ovary; *s*, shell gland; *t*, profusely branched testicles; *ut*, uterus; *va*, vagina; *vg*, profusely branched vitellogene glands. (After Looss, 1896, Pl. III, fig. 16.) See p. 48.



FIG. 27.—The Giant Liver Fluke (*Fasciola gigantica*), enlarged to show the anatomy. (After Cobbold, 1864.) See p. 49.



*Distomum texanicum* Francis, 1891; *D. americanum* (Hassall) Stiles, 1892; *Fasciola magna* (Bassi) Stiles, 1894.

BIBLIOGRAPHY.—For bibliography and technical discussion, see Stiles (1894–1895).

HOSTS.—Cattle, deer, and other animals. (See pp. 137–143.)

GEOGRAPHICAL DISTRIBUTION.—North America (Texas, Arkansas, Indian Territory, California, Iowa, Illinois, New York, and probably elsewhere); Europe (Italy).

The Large American Fluke appears to be more frequent in this country than the so-called Common Liver Fluke, although this opinion is the result of general impression from abattoir inspection rather than a view based upon actual statistics. The parasite was first described by Bassi, who found it producing a fatal epizootic among the deer of the Royal Park near Turin, Italy, where it is supposed to have been introduced with imported Wapiti from North America. Dinwiddie has found that in some counties of Arkansas practically all the cattle are infected

with this worm, and for years the livers of cattle from certain districts have been unfit for use. As the infected area fell within the cattle-fever district, some persons erroneously thought that the changes produced in the liver were due to Texas fever. Fortunately this species (so far as known) does not occur in sheep, and on that account it must be looked upon as of less importance than the common fluke.

Leidy (1891) thought this species identical with "*Distomum crassum*," which occurs in man, and Stossich (1892) considered it identical with the giant fluke *Gladocoeilium giganteum* (= *Fasciola gigantica*) of giraffes.

*Life history.*—The complete life history of this parasite has not yet been experimentally demonstrated, but as the

species is so closely allied to the Common Liver Fluke, it will unquestionably be found that the life cycle agrees with that given for *Fasciola hepatica* (p. 30).

Upon several different occasions experiments have been instituted in this Bureau to trace out the life cycle, but the snails we have collected

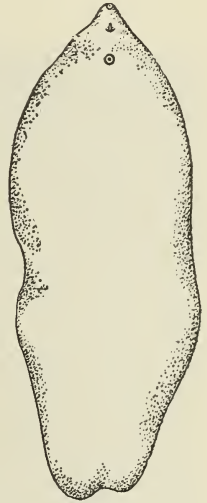


FIG. 28.—The Large American Fluke (*Fasciola magna*), natural size (original).

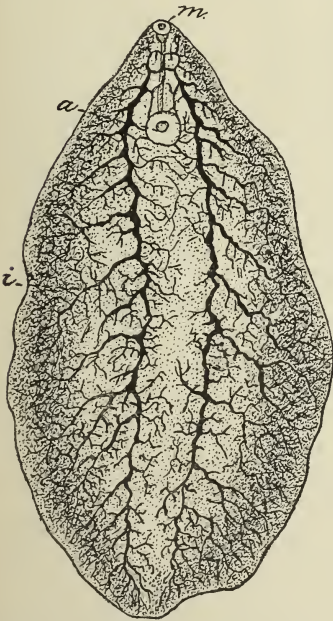


FIG. 29.—Macerated specimen of Large American Fluke, showing the digestive system and acetabulum.  $\times 2$ . (After Stiles, 1894, p. 226, fig. 2.)

in the locality of the District of Columbia have thus far not taken the infection.

*Egg*.—The eggs (fig. 32) of *F. magna* can hardly be distinguished from those of *F. hepatica*. In general, however, they are slightly larger. In *F. hepatica* they vary from 0.105 mm. to 0.145 mm. (rarely 0.172 mm.) long by 0.063 mm. to 0.09 mm. broad. In *F. magna* they vary from

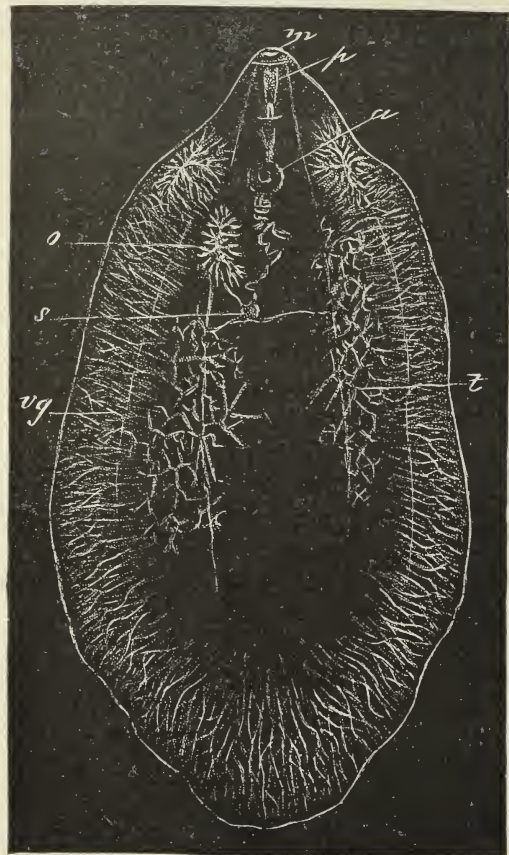


FIG. 30.—Macerated specimen of Large American Fluke (*Fasciola magna*), showing the anatomical characters: *a*, acetabulum; *m*, mouth with oral sucker; *o*, ovary; *p*, pharyngeal bulb; *s*, shell gland; *z*, profusely branched testicles; *vg*, profusely branched vitellogene glands.  $\times 2$ . (After Stiles, 1894, p. 236, fig. 3.)

0.109 mm. to 0.168 mm. long by 0.075 mm. to 0.096 mm. broad. The structure of the egg agrees perfectly with that given for the Common Liver Fluke, so that a differential diagnosis in faecal examinations is impossible. Upon several different occasions we have raised the —

*Miracidium* (figs. 33, 34), which agrees with the ciliated embryo of *F. hepatica* (see p. 32). It is covered with a ciliated epithelium, and upon its anterior end is found a papilla in which an opening is perfectly visible. This opening leads into a thin string of tissue, evidently a rudimentary oesophagus, ending in a double-lobed body, which from homology with *F. hepatica* represents the rudimentary intestine. Immediately anterior of this is situated the ganglionic mass with the two cup-shaped eye-spots. In the posterior portion of the body a number of germ

cells can be distinguished. The movements of this embryo agree with those of *F. hepatica*. The size varies according to contraction, but in general it may be given as 0.15 mm. long by 0.04 mm. broad.

*Sporocyst, redia, and cercaria*.—For a description of these stages (not yet known for *F. magna*), see pp. 32 and 33.

*The disease*.—The remarks upon this subject on page 36, under *F. hepatica*, will apply in a general way to this parasite also. The large



fluke appears to be more dangerous for cattle, however, than the common fluke. According to Francis, many cattle die from the effects of the common fluke, and those which recover do not thrive the following summer, but remain poor and weak and fail to breed—remarks which if well founded for *F. hepatica* would apply in a still greater degree for *F. magna*. Heifers coming 2 years old suffered more than at any other age. It is stated that the large fluke has caused disease among the dairy cows in California, and Francis is said to have investigated an outbreak in Texas where the loss ran into hundreds of cattle. In the Italian outbreak, the disease corresponded with fluke disease of sheep, and reached its highest stage during the winter and spring. Biting (1895) records fluke disease in cattle for Florida, but attributes it to the common fluke.

*Symptoms.*—See remarks under *F. hepatica*, pp. 34–36.

*Pathology.*—The pathological changes brought about by this form have never been studied in detail, but

the earlier changes will doubtless agree with those described for *F. hepatica*. In heavily infected livers there is a much greater tendency to the formation of large cysts in the liver, in which several parasites are present. Dinwiddie has described a post-mortem as follows:

Apparently in good health and fair butchering condition. The “fat caul” seen on first opening the abdomen as a large sheet was dotted with black spots and streaks. Lymphatic glands on the concave surface of the liver were much swollen and black in color. The liver itself was enlarged and darkened on the surface, with a number of prominent elevations, some appearing like blisters and some more or less solid, and varying greatly in size. A longitudinal section showed the presence of many cavities, some containing a dark fluid in which were floating granules and shreds of tissue. One very large cavity, about 2 inches in diameter, with irregular yellowish colored walls, besides the dark-colored fluid above mentioned, contained also two flat, leaf-like bodies about one inch in length and slightly less in breadth. They were fished out and recognized as “flukes.” More of these were obtained from other cavities. Several other cavities contained solid, greenish-yellow, gritty matter, and no parasites. A section made through the liver in any direction cut through one or more of these cysts. They were situated near the surface of the organ or in its substance indiscriminately. Those that contained the “fluke” were usually of medium or smaller size, and the parasite was found folded or curled upon itself longitudinally and surrounded by fluid. \* \* \*

The shreds of tissue found in



FIG. 31.—A section of the cuticle of Large American Fluke (*Fasciola magna*), showing the spines. (After Stiles, 1894, p. 227, fig. 7.)

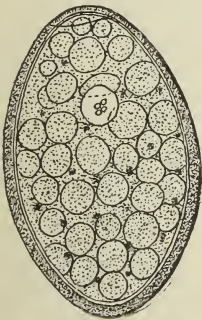


FIG. 32.—Egg of Large American Fluke, showing the germ cell, surrounded by a large number of vitelline cells, and an eggshell provided with a cap. (After Stiles, 1894, p. 227, fig. 4.)

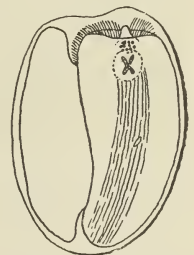


FIG. 33.—Ciliated embryo (miracidium) of Large American Fluke within the eggshell. (After Stiles, 1894, p. 227, fig. 5.)

those cysts, which did not contain the living parasites, were shown by microscopic examination to be the débris of dead and partly decomposed flukes.

Such were the gross appearances of the livers of at least three-fourths of the cattle slaughtered during the spring and summer at this place, and about 90 per cent of all coming from certain ranges in St. Francis and Lee counties [Arkansas].

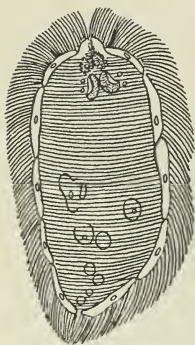


FIG. 34.—Free embryo (miracidium) of Large American Fluke (*Fasciola magna*), showing ciliated epithelium, boring papilla, rudimentary oesophagus, and intestine; eye-spots situated above the ganglionic mass, and germ cells. (After Stiles, 1894, p. 227, fig. 6.)

I am inclined to think that the effects of the parasite upon cattle have possibly been somewhat overestimated, for I have seen cattle in abattoirs which were apparently in excellent condition and yet whose livers were literally composed almost entirely of flukes and their cysts. The question arises whether other factors (Texas fever, blackleg, etc.) also were not concerned in the outbreaks among cattle which have been attributed to this parasite. A small number of these worms certainly has little or no appreciable effect upon cattle, and even when a large number is present the effects do not appear to be very great in the case of full-grown steers. The fact that Francis has attributed the death of a number of cattle (chiefly 2-year-olds) to this worm is deserving of attention, but the published accounts of these outbreaks are not detailed enough to allow a

satisfactory conclusion. While it must be admitted that the pathological changes in the liver of cattle caused by this parasite can not help producing some effect upon the host, we are perfectly warranted in the statement that the Large American Fluke bears a much less important relation to the cattle industry than the common fluke bears to the sheep industry.

**Diagnosis.**—Same as for the common fluke. (See p. 39.)

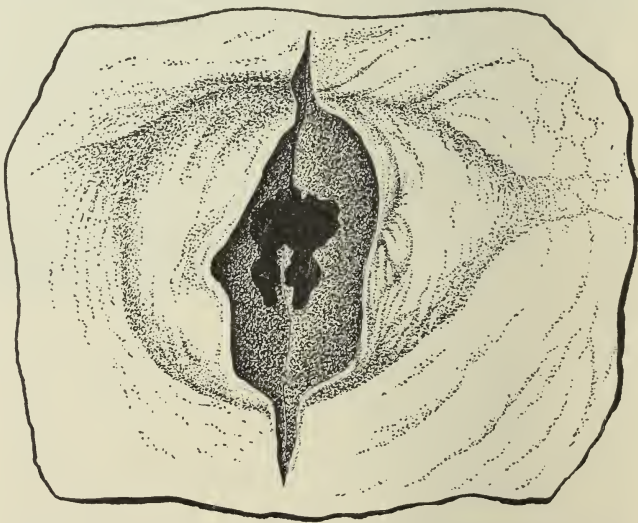


FIG. 35.—Cyst in the liver, caused by Large American Fluke. (After Stiles, 1894, p. 226, fig. 1.)

**Position of the parasites.**—Thus far the large fluke has been recorded only in the liver and lungs.

**Influence of age.**—The remarks on page 40 under this heading will doubtless be found to hold for the large fluke also.

*Geographical distribution; fluky years and fluky seasons.*—*F. magna* is known from the localities given on page 51. (See also remarks under this head in the discussion of *F. hepatica*, p. 40.)

*Time of infection.*—The remarks under this head on page 42 will apply in a general way to this parasite also.

*Source of infection.*—The intermediate host is as yet

unknown, but it should not be a difficult matter to determine this point in the infected areas. It will undoubtedly be found to be a snail, probably of the genus *Limnaea*.

*Treatment and preventive measures.*—See pages 43–47.

Fig. 36.—Lancet Fluke (*Dicrocoelium lanceatum*), natural size (original).



#### ABATTOIR INSPECTION.

*Fluked animals as food.*—Regarding the flukes in the liver, see page 47. I have examined the meat of a large number of cattle whose livers were infested with this parasite, and have been unable to find any ground for excluding the meat from market. (See also pp. 47–48.)

#### DICROCOELES (Distomes of the Genus *Dicrocoelium*).

One representative of this genus, namely, *D. lanceatum*, has been recorded for cattle, sheep, and hogs, and a second species (*D. pancreaticum*) has been recorded for cattle and sheep, but there is no satisfactory evidence that either parasite is present in this country. (See p. 56.)

#### 5. The Lancet Fluke (*Dicrocoelium lanceatum*) of Cattle, Sheep, and Swine.

[Figs. 36–39.]

Fig. 37.—Lancet Fluke, enlarged to show the anatomical characters: *a*, acetabulum; *c*, cirrus pouch; *i*, intestine; *m*, mouth with oral sucker; *o*, ovary; *oe*, oesophagus; *p*, pharyngeal bulb; *t*, lobate testicles; *u*, uterus; *va*, vagina; *vg*, vitelline glands. (After Stiles & Hassall, 1894, Pl. IV, fig. 19.)

For anatomical characters, compare fig. 37 with key, p. 21.

**VERNACULAR NAMES.**—English, *Lancet Fluke*; German, *Der lanzettförmige Leberegel*, *das lanzettförmige Doppelloch*; French, *Distome lanceolé*; Italian, *Distoma lanceolato*.

**SYNONYMY.**—*Fasciola lanceolata* Rudolphi, 1803 [nec Schrank, 1790]; *Distoma lanceolatum* (Rudolphi) Mehlis, 1825; "*Distoma (Dicrocoelium) lanceolatum* Mehlis" of Dujardin, 1845; "*Distomum lanceolatum* Mehlis" of Diesing, 1850; "*Dicrocoelium lanceolatum* Dujardin" of Weinland, 1858; "*Fasciola Buchholzii* Jördens, 1801," misprint of Braun, 1889; *Dicrocoelium lanceatum* Stiles & Hassall, 1896.



**BIBLIOGRAPHY.**—No extensive bibliography as yet published. For detailed technical discussion, see Leuckart (1889, pp. 359-399).

**HOSTS.**—Man, cattle, sheep, swine, and other animals. (See pp. 137-143.)

**GEOGRAPHICAL DISTRIBUTION.**—Very extended, especially in Europe, but apparently not in England or North America.

**Life history.**—The complete development of this parasite is not yet known, although it is undoubtedly an indirect development with change of host, the intermediate host being some mollusk.

Von Willemoes-Suhm looked upon *Planorbis marginatus* as intermediate host; a *Limnaea* has also been viewed with suspicion. Leuckart found some cercariae in a *Planorbis*, which he suspected for a while represented the larval stage of this worm; but as none of these snails have as yet been experimentally proven to be

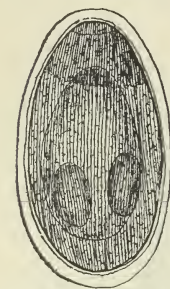


FIG. 38.—Egg of Lancet Fluke (*Dicrocoelium lanceatum*) with contained embryo.  $\times 700$ . (After Leuckart, 1889, p. 379, fig. 171.)

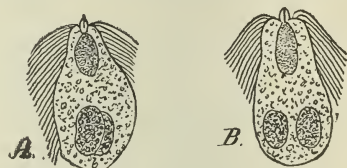


FIG. 39.—Free embryo (miracidium) of the Lancet Fluke: A, lateral view; B, dorsal view. (After Leuckart, 1889, p. 385, fig. 175 A, B.)

the host of the larval stage of the parasite, the question is at present far from being solved. In Leuckart's most recent experiments he has fed eggs of the parasite to certain small slugs and noticed that the embryos escaped from the egg, but were unable to develop

into the sporocyst stage. That the embryos escaped from the eggshell in the intestine of slugs points to the fact that the experiments are in the right direction, and that it will probably be found that some snail belonging to the family Limacidae—the slugs—in the order of the Pulmonata serves as intermediate host to the Lancet Fluke.

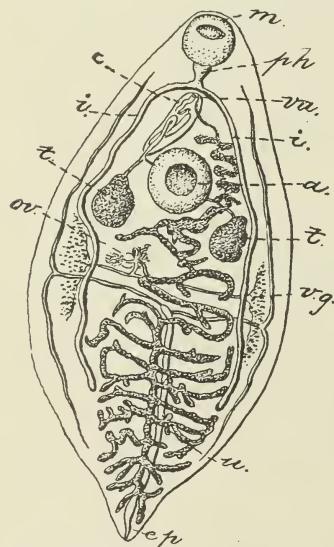


FIG. 40.—The Pancreatic Fluke (*Dicrocoelium pancreaticum*), enlarged to show the anatomical characters: a, acetabulum; c, cirrus pouch; cp, excretory pore; i, intestine; m, mouth with oral sucker; ov, ovary; ph, pharyngeal bulb; t, testicles; u, uterus; va, vagina; vg, vitellogene glands. (After Railliet, 1897.) See p. 57.

The Lancet Fluke is much less dangerous, owing to its smaller size and unarmed cuticle, than either the common fluke or the large fluke; and the pathological changes caused by the Lancet Fluke, even when present in large numbers, are scarcely ever more than a catarrhal affection of the gall ducts, rarely with secondary troubles. The parasite is frequently found in very large numbers, cases being recorded where 1,000 specimens or more have been taken from a single liver; it may occur alone or in company with *F. hepatica*. It has been recorded about six times in man.

Leidy (1856, p. 43) says that this parasite is "stated to be frequent in sheep in several of the Western States." This "statement" may be correct, but we have not yet been able to verify it.



## ABATTOIR INSPECTION.

In abattoir inspection, the rules given for infection with *F. hepatica* (p. 47) would apply to cases of infection with the Lancet Fluke.

**6. The Pancreatic Fluke (*Dicrocoelium pancreaticum*) of Cattle and Sheep.**

[Fig. 40.]

For anatomical characters, see key, p. 21.

SYNONYMY.—*Distoma pancreaticum* Railliet, 1890; *Distoma coelomaticum* Giard & Billet, 1892; *Distomum pancreaticum* Janson, 1893; *Distoma* (*Dicrocoelium*) *coelomaticum* Giard & Billet of Railliet, 1896; *Dicrocoelium pancreaticum* (Railliet) Railliet, 1897.

BIBLIOGRAPHY.—Railliet, 1897, pp. 371-377.

HOSTS.—Japanese cattle and sheep, Cambodia cattle and Indian buffalo. (See pp. 137-143.)

The Pancreatic Fluke, which is somewhat smaller than the common fluke but larger than the Lancet Fluke, has been found in Japan, Tonkin, and Cochin China, but is not yet recorded for North America; it is said to be present in about 50 per cent of the cattle and buffaloes of Cochin China, slaughtered in good condition, and in 90 per cent of the cachectic animals; it is found at all seasons of the year, both wet and dry. Its normal seat is the Ductus Wirsugianus and its branches, which are occasionally given a sausage-like appearance by the presence of the parasites. The local lesions developed by the presence of the Pancreatic Fluke are not generally very extensive; in many cases the pancreas seems quite normal; when the infection is extensive, however, this organ is thicker and heavier than usual; occasionally blackish streaks are noticed on the surface, representing the infected canals, but usually it is necessary to cut into the organ in order to recognize an infection. Even when the infected canals assume a sausage-like or moniliform appearance, no abnormal fluid appears to be present, and the thickening and induration of the walls are scarcely noticeable.

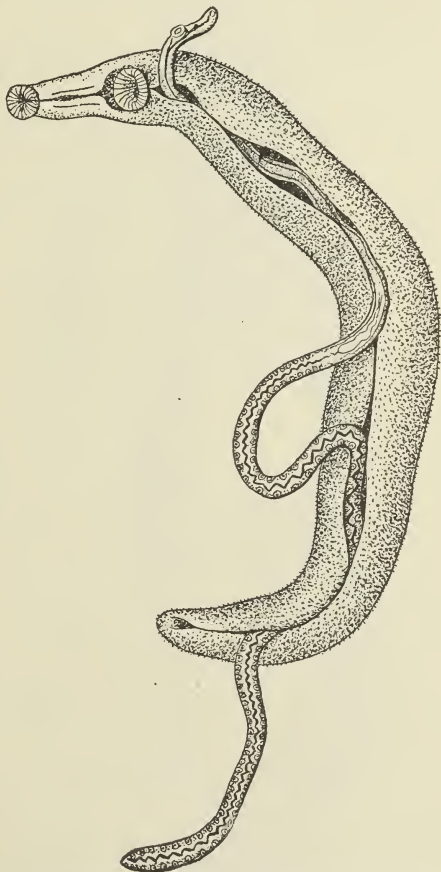


FIG. 41.—Male and female specimens of the Human Blood Fluke (*Schistosoma haematobium*), enlarged.  $\times 12$ . (After Looss, 1896, Pl. XI, fig. 107.) See p. 58.

There is at present no reason to assume that these parasites would continue to live for any length of time if accidentally eaten by man; in fact, their direct transmission from cattle to man through eating sweet-breads infected by them is contrary to analogy.

### Dioecious Distomes (Flukes of the Subfamily *Schistosominae*).

#### BLOOD FLUKES (Distomes of the Genus *Schistosoma*).

Flukes of this genus, only a few of which are known, live in the veins of mammals and birds. At least one species (*S. bovis*) is found in cattle and sheep, while the occurrence of a second form (*S. haematobium*) in cattle is as yet in need of confirmation.

The Human Blood Fluke has been found twice in this country: once in a foreigner on the "Midway" during the World's Fair, and once in New York.

#### 7. The Human Blood Fluke (*Schistosoma haematobium*) of Man and Cattle (?).

[Figs. 41-44, 48.]

For anatomical characters, compare figs. 41-43 with key, p. 21.

SYNONYMY.—*Distomum haematobium* Bilharz, 1852; *Schistosoma haematobium* (Bilharz) Weinland, 1858; *Gynaecophorus haematobius* (Bilharz) Diesing, 1858; *Bilharzia haematobia* (Bilharz) Cobbold, 1859; (?) *Bilharzia magna* Cobbold, 1859; *Thecosoma haematobium* (Bilharz) Moquin-Tandon, 1860; *Distoma capense* Harley, 1864, nomen nudum; *Bilharzia capensis* Harley, 1864; *Bilharzia haematobia hominis* Kowalewski, 1895; (?) *Bilharzia haematobia magna* (Cobbold) Kowalewski, 1895; *Schistosomum haematobium* (Bilharz) of Blanchard, 1895.

BIBLIOGRAPHY.—For bibliography, see Huber (1894, pp. 294-305). For detailed anatomical study, see Looss (1895, pp. 1-108) and Leuckart (1894, pp. 464-534).

HOSTS.—Man, Sooty monkey (?), and cattle (?). (See pp. 137-143.)

GEOGRAPHICAL DISTRIBUTION.—Africa.

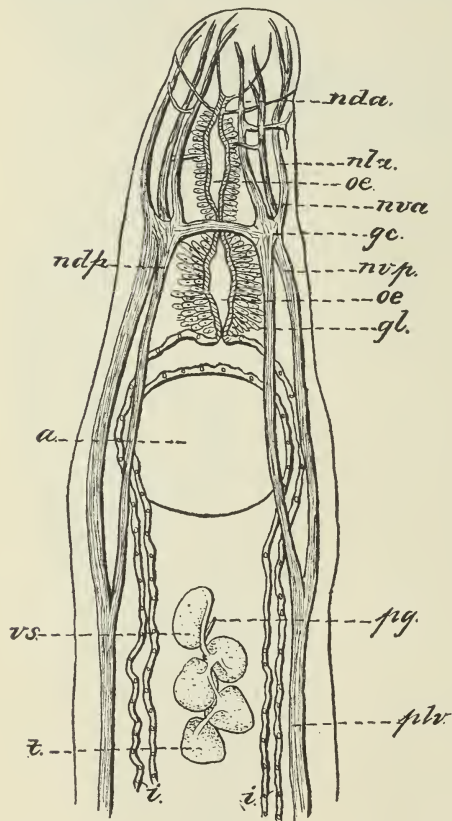


FIG. 42.—Anterior portion of male Human Blood Fluke (*Schistosoma haematobium*), showing the anatomical characters: a, acetabulum; gc, cerebral ganglion; gl, glands of oesophagus (oe); i, intestine; nda, dorsal anterior nerve; ndp, dorsal posterior nerve; nla, lateral anterior nerve; nva, ventral anterior nerve; nvp, ventral posterior nerve; plv, lateral posterior nerve; pg, genital pore; t, testicles; vs, vesicula seminalis. (After Looss, 1895, Pl. II, fig. 18.)

*Life history.*—The following may be taken as a summary of our present incomplete knowledge of the life history of this parasite. The eggs which are passed in the urine contain a ciliated embryo possessing a terminal papilla; a rudimentary intestinal sac, at each side of which

is a large glandular cell; a rudimentary nervous system; an excretory system, and a number of germinal cells. While in the fresh urine the embryo is comparatively quiet, but more active movements can be brought about by the addition of water; water also causes the shell to burst, the embryo becoming free; preserved in urine the embryos die within about two hours. From this embryonic stage to the time when the parasites are found in the body we have no positive data concerning the life history, although clinical observation and analogy point to unfiltered water as the source of infection.

Sonsino concluded from his recent investigations that fresh-water crustaceans (*Gammarus Simoni*) and insects form the intermediate hosts; that the embryo develops through a larval stage ("*Dicotyle*"), but without an alternation of generations, and that man becomes infected by swallowing the "*Dicotyle*."

While analogy points directly to some fresh-water invertebrate as the intermediate host, the presence of germ cells in the miracidium points to a necessary alternation of generations as opposed to Sonsino's idea of a metamorphosis.

**Hosts.**—The Human Blood Fluke is found in man in Africa, especially in Egypt. A parasite found by Cobbold in the Sooty monkey (*Cercopithecus fuliginosus*), and described as *Bilharzia magna*, may possibly be identical with this parasite of man.

Cobbold, Leuckart, and Blanchard admit the identity of the two forms, while some other authors do not consider the point as yet established.

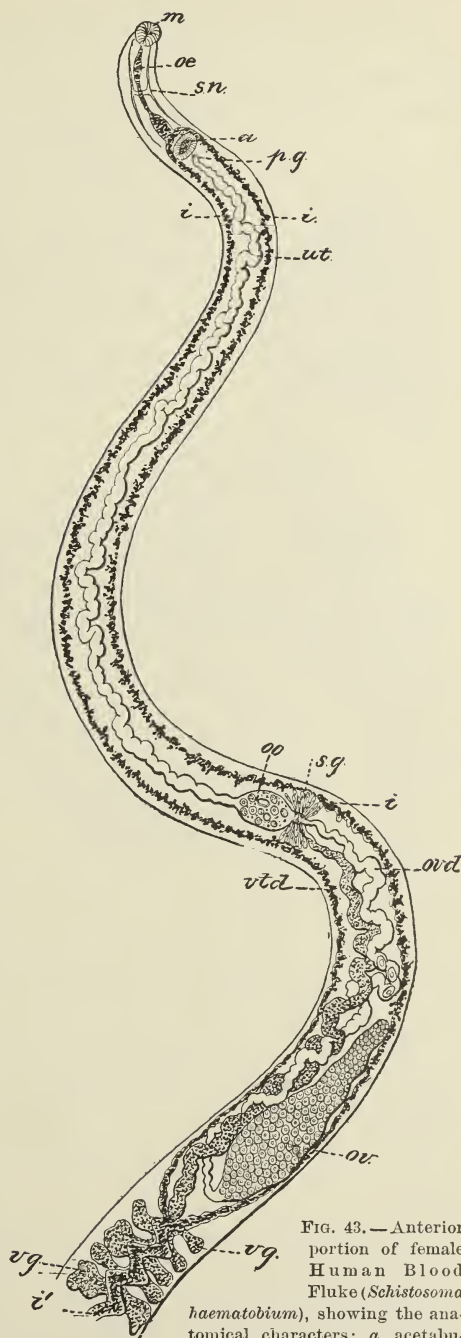


FIG. 43.—Anterior portion of female Human Blood Fluke (*Schistosoma haematobium*), showing the anatomical characters: a, acetabulum; i, intestine which is double for some distance, but the two caeca unite (i') back of the ovary; oe, oesophagus; oo, ootype; ov, ovary; ovd, oviduct; pg, genital pore; sg, shell gland; sn, nervous system; ut, uterus; vtd, vitello duct; vg, vitellogene glands.  $\times 38$ . (After Looss, 1896, Pl. XI, fig. 103.)

Looss, 1896, Pl. XI, fig. 103.)



*Schistosoma haematobium* has been recorded once from cattle in Calcutta, but the determination is perhaps open to question. The exact data given are as follows:

Bomford found the peculiar uncinatè ova of *Bilharzia* on microscopic examination of the large intestines of two Calcutta transport cattle destroyed on account of their being considered affected with rinderpest. In one case numerous eggs were found in a small portion of the caecum preserved in absolute alcohol. They were most numerous within or between the tubular glands of the mucous membrane, but were also present in considerable numbers in the submucous tissue below the muscularis mucosae. The alcohol had shriveled up the contents of the eggs, but the external form of the shell was preserved and the characteristic hook very clearly seen. In another bullock the ova were found in some papillomatous growths removed from the margin of the anus. In this case the form of the embryo in the ova could be distinguished. The ova exactly resemble those of *Distomum* (*Bilharzia*) *haematobium* hitherto found only in man (or a monkey), and in Africa, Arabia, or Mauritius. Sonsino's *Bilharzia boris* of Egyptian cattle differs in the spindle shape of its eggs and in their short, broad, caudate spine. These bullocks had not served in Egypt, but may possibly have obtained the parasites from Indian transport cattle which had done so. This parasite should be sought for in cases of Haematuria of cattle and when the ileocaecal ring is found congested. (See Mem. Med. Officers Army

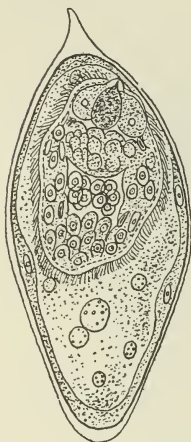


FIG. 44.—Egg of Human Blood Fluke (*Schistosoma haematobium*), with contained embryo, passed in the urine.  $\times 285$ . (After Looss, 1896, Pl. XI, 112.)

India, II (1886), 1887, p. 53.)

### 8. The Bovine Blood Fluke (*Schistosoma boris*) of Cattle and Sheep.

[Figs. 45-47.]

For anatomical characters, compare figs. 45 and 46 with the key, p. 21.

SYNONYMY.—*Bilharzia boris* Sonsino, 1876; *Bilhartzia crassa* Sonsino, 1877; *Gynaecophorus crassus* (Sonsino) Stossich, 1892; *Gynaecophorus boris* (Sonsino) Railliet, 1893; *Bilharzia haematobia crassa* (Sonsino) Kowalewski, 1895; *Schistosomum boris* (Sonsino) R. Blanchard, 1895.

BIBLIOGRAPHY.—For bibliography, see R. Blanchard (1895, p. 191). For anatomical discussion, see Leuckart (1894, pp. 464-534).

HOSTS.—Cattle and sheep. (See pp. 137-143.)

GEOGRAPHICAL DISTRIBUTION.—Egypt, Italy, Sicily, India (?).

This parasite was discovered by Sonsino (1876) in Egypt in the portal veins of the ox and later he found it in sheep, while Grassi and Rovelli afterward found it in about 75 per cent of the sheep slaughtered at Catania, Sicily. The sheep were born and raised on the neighboring plains.

The worm is said to bring about in cattle and sheep the same lesions of the bladder, intestine, etc., which *S. haematobium* causes in man. Nothing is known regarding the life history.



FIG. 45.—The Bovine Blood Fluke (*Schistosoma boris*), male and female.  $\times 9$ . (After Leuckart, 1894, p. 467, fig. 204A.)

## THE DISEASE BILHARZIOSIS.

As this disease in man has been subjected to much more thorough study than the same malady in cattle and sheep, the human subject may well be taken as basis for the discussion.<sup>1</sup>

*Source of infection.*—As already stated, clinical observation and analogy point to unfiltered drinking water as the source of infection.

*Position of the parasite.*—The worms are found in the veins of the abdomen, the vena porta, vena linealis, vena renalis, and the venous plexus of the bladder and of the rectum.

*Symptoms.*—The period of incubation has not been definitely determined, but Hatch records the case of a patient who remained fourteen days at Suez and suffered from bilharzian haematuria one month after his arrival at Bombay. The young parasites appear to do no injury; in fact, even the adult worms seem to be inoffensive in themselves. The eggs on the other hand, armed with a sharp point, are the exciting cause of the disease. The position of the parasite in the venous system and the consequent location of the agglomeration of eggs determine the particular symptoms. Either the genito-urinary system is attacked, in which case haematuria is one of the first symptoms; or the large intestine is attacked and blood is noticed in the stools.

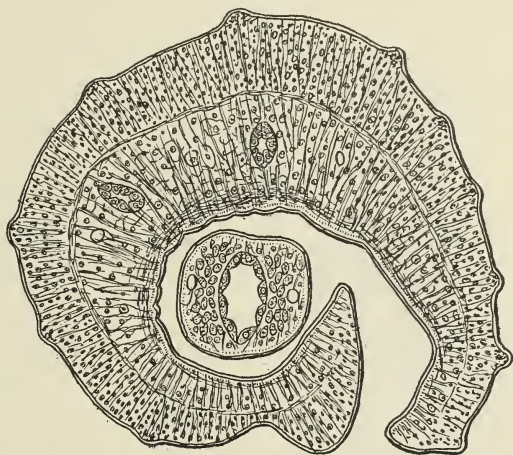


FIG. 46.—Cross section of Bovine Blood Fluke (*Schistosoma bovis*), showing the position of the female in the gynaeophoric canal.  $\times 200$ . (After Leuckart, 1894, p. 472, fig. 209.)

If the parasites are lodged in the venous plexus of the genito-urinary system, the chief symptoms are: Haematuria; pains in the lumbar region, the left iliac fossa, the thigh, or in the vulva, which may be spontaneous or may accompany micturition; cystitis; vesical calculus; urinary fistulae; vaginal verminous tumors; nephritis.

The eggs accumulate in the capillaries, which they rupture; they traverse the mucosa and fall into the bladder, thus causing more or less hemorrhage; in this way the haematuria is established, which is often the initial symptom. At first the urine is quite bloody, but it gradually becomes clearer, and it is only at the end of micturition that muco-purulent flakes are expelled, in which numerous eggs and even embryos are found; the urine contains also epithelial cells, more or less pus, eggs, and occasionally embryos. On micturition sharp pains are felt at the base of the penis or at the gland, possibly due to the passage of eggs. The passage of eggs

<sup>1</sup> This discussion is based chiefly upon Blanchard, 1895, pp. 69-93.

through the walls of the bladder give rise to *cystitis*; blood becomes more abundant in the urine after fatigue, coitus, or after taking alcoholics; clots may form and cause retention of urine; chronic urethritis may develop, evidently due to the presence of the eggs. In Egypt 80 per cent of the cases of *vesical calculus* coincide with bilharziosis; the formation of the calculi evidently results from the presence of the eggs, for the central nodule always contains one or more of these structures. Urinary fistulae, opening on the perineum, more rarely into the rectum, occasionally form. In women, the vagina may become the seat of a chronic inflammation; it is painful to the touch, exudes a bloody foetid discharge, and may become ulcerated or may be covered with numerous sessile or pedunculate *tumors*, which are very vascular and spongy, and contain the parasites or their eggs. The mucosa of the vagina, also the uterus and bladder, become impregnated with calcareous salts. *Nephritis* develops in grave cases.

If the parasites lodge in the veins of the rectum the lesions caused are analogous to those described for the genito-urinary tract; among the most prominent symptoms are bloody stools, dysenteric diarrhoea, enterorrhagia, and prolapse of the rectum. The mucosa is studded with numerous papilliform outgrowths, which occasionally attain considerable size and require surgical interference.

The heart, lungs, and liver generally remain normal.

*Pathology.*—The bladder is reduced in size, while its wall is greatly thickened, due chiefly to the hypertrophy of the muscularis; the mucosa is also thickened, and at certain points it is indurated by uric or calcareous deposits, but the principal lesion consists in ulcerations covered with sanious pus; the mucous membrane is infiltrated with numerous leucocytes, but with few eggs; the submucous connective tissue, however, contains numerous eggs, which also fill the blood vessels; most of the eggs

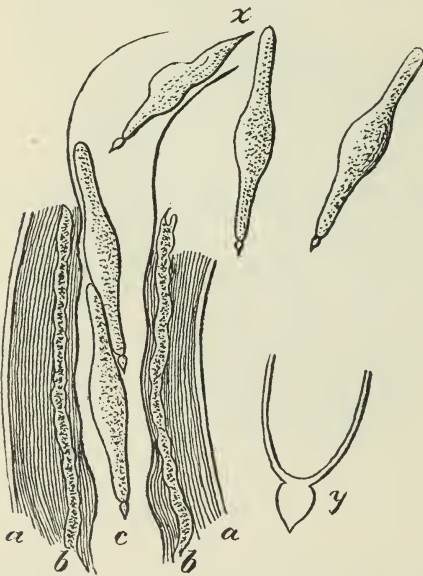


FIG. 47.—Eggs of Bovine Blood Fluke (*Schistosoma bovis*), showing the peculiar process on the end: *a, b*, layers of the oviduct; *c*, eggs in the oviduct  $\times 180$ ; *x*, eggs deformed by pressure; *y*, spinous process on end of egg  $\times 700$ . (After Sonsino.)

are dead and more or less degenerated; frequently the mucosa is hypertrophied in places so that papillae are formed which are larger than those found in cases of simple catarrh of the bladder; they occasionally attain a finger in length, and may be recognized during life by cystoscopic examination. Harrison noticed in four cases out of five at Alexandria, Egypt, that the tumors developed in the tissue of the bladder had a carcinomatous character. Lesions analogous to those of the bladder are also observed in the lower third of the ureters and may extend as high as the kidney; the ureter is enlarged and tortuous; the mucosa irregular; its lumen may remain nearly normal in size, but its wall becomes very thick. The flow of the urine may be obstructed. The kidney increases in size, its calyx dilates, the division between cortical and medullary substance becomes indistinct, and the renal tissue may be reduced to an almost homogenous layer 3 to 4 mm. thick; miliary abscesses form on the surface; in short, a veritable hydronephrosis obtains, which results in atrophic



lesions of the kidney and may finally end fatally; death may occur rather frequently from albuminuria; in the less grave cases the renal affection consists of a simple inflammation and parenchymatous nephritis; renal calculi may form; the organ may become the seat of a more or less intense cirrhosis. The vesicula seminalis and prostata may also contain eggs, and become more or less hypertrophied.

The polyps of the rectum, mentioned above, may attain 10 mm. to 13 mm. in length; the eggs are accumulated, especially in the mucosa, and may form masses 1.25 mm. thick, visible to the naked eye; a microscopic examination of the growths shows that they are composed in great part of mucosa, the glands (the normal length of which is about 0.5 mm.) becoming 2 to 3 or 3.5 mm. in length by  $60\mu$  to  $80\mu$  in diameter. Between the polyps the mucosa shows the lesions of chronic dysentery; all the tunics exhibit traces of a slow phlegmatic process; the submucosa is infiltrated with leucocytes; the muscularis may hypertrophy to three or more times its normal thickness.

The mesenteric lymphatic glands may hypertrophy, their substance becoming tumified, presenting small hemorrhagic centers, and containing eggs. The liver may contain eggs and become somewhat cirrhotic; the eggs accumulate in the branches of the portal veins, or after piercing the walls they lie in the hepatic parenchyma. The lungs may also contain eggs, as was shown by Mackie in the case of a patient who succumbed to pyemia following a purulent cystitis. He found in the lungs a large number of small metastatic abscesses limited by a necrotic tissue and containing a sanious pus with *Schistosoma* ova.

**Diagnosis.**—The diagnosis may easily be made by a microscopic examination of the urine to determine the presence of the egg.

**Prognosis, etc.**—The severity of the disease varies directly with the number of parasites (and hence the number of eggs) in the body. Fortunately, in the majority of cases the number of parasites is small, though it may increase from repeated infections to 500 or more. In cases of comparatively light infection, the disease is reduced to a slight chronic cystitis, with now and then exacerbations, in course of which a slight amount of blood and pus is passed in the urine. The disease may last for years without apparent increase. In the most severe cases death may occur from various causes; a rupture of the bladder, ascending pyelonephritis, uremia, albuminuria; the patient may die in marasmus, being exhausted by the dysentery or the anaemia.

Bilharziosis is accordingly not such a fatal disease as has sometimes been supposed.

**Prevention.**—Avoid unfiltered or unboiled water in contaminated districts.

**Treatment.**—No experiments in treating cattle for this disease have been recorded.

In human practice Fouquet seems to have had good success with capsules of extract of male fern; he begins with one capsule per day, afterward increasing the dose to two or in some cases to three capsules. The dosing is continued with persistency until the patient seems recovered; the dose is then reduced to one capsule daily



FIG. 48.—Ureter of an Egyptian, with numerous uric-acid concretions, as a result of blood-fluke infection. (After Leuckart, 1894, p. 528, fig. 231.)

for one month. Intravesical injections of bichloride of mercury 1:5000 are advised in severe cases. Nitrate of silver, carbolic or boric acid are also used as injections or enemata. Napier claims good results with salicylate of soda; 40 grains before retiring. Surgical intervention is occasionally necessary in cases of severe lesions.

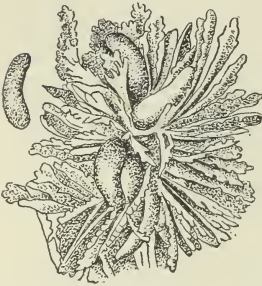


FIG. 49.—Conical amphistomes (*Amphistoma cervi*) in the rumen; tubercles from which the parasites have loosened. (After Railliet, 1893, p. 376, fig. 249.)

#### ABATTOIR INSPECTION.

At present the blood flukes do not play any rôle in the inspection at American abattoirs. Should the parasite appear in this country it will probably first be found in Southern cattle, and the affected organs should be condemned in order to prevent the spread of the worm. There would, however, be no danger of transmission of the parasite from cattle direct to man.

#### AMPHISTOMES (Flukes of the Family Amphistomidae).

Of this family of worms, characterized by the position of the acetabulum in the posterior portion of the body, only one species (*Amphistoma cervi*) has as yet been recorded in the herbivorous animals of North America.

#### TRUE AMPHISTOMES (Flukes of the Genus *Amphistoma*).

##### 9. The Conical Fluke (*Amphistoma cervi*) of Cattle and Sheep.

[Figs. 49-55.]

For anatomical characters, compare figs. 49 and 50 with key, p. 21.

**SYNONYMY.**—*Festucaria cervi* Zeder, 1789; *Fasciola cervi* (Zeder) Schrank, 1790; *Fasciola elaphi* Gmelin, 1790; *Monostoma elaphi* (Gmelin) Zeder, 1800; *Monostoma conicum* Zeder, 1803; *Amphistoma conicum* (Zeder) Rudolphi, 1809; *Amphistomum conicum* (Zeder) of Diesing, 1850; *Strigea cervi* (Zeder) Railliet, 1893.

**BIBLIOGRAPHY.**—For bibliography, see Otto (1896, pp. 97, 98). For technical discussion, see Otto (1896), Looss (1896, pp. 32, 33, 185-191), and Leuckart (1894, pp. 448-464).

**HOSTS.**—Cattle, sheep, deer, and other animals. (See pp. 137-143.)

**GEOGRAPHICAL DISTRIBUTION.**—Europe, Africa (Egypt), Asia, Australia, Canada, and probably elsewhere.

**Life history.**—Sonsino found in an Egyptian snail a larval parasite (*Cercaria pigmentata*) which, according to some authors, represents the larval stage of this amphistome. The life cycle has recently been experimentally demonstrated by Looss (1896), who describes it as follows.

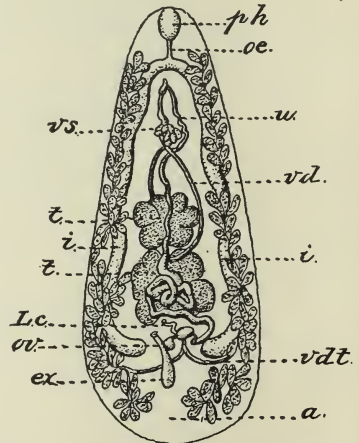


FIG. 50.—Dorsal view of a Conical Amphistome, showing the anatomical characters: *a*, position acetabulum; *ex*, terminal vesicle of excretory system; *i*, intestinal caeca; *Lc*, Laurer's canal; *oe*, oesophagus; *ov*, ovary; *ph*, pharynx; *t*, testicles; *u*, uterus; *vd*, vas deferens; *vdt*, vitello duct; *vs*, vesicula seminalis.  $\times 5$ . (After Otto, 1896, p. 100, fig. 4.)

The eggs escape from the host with the faeces. After a time, evidently varying with the temperature (twelve to fourteen days at 22° C.), a ciliated embryo is formed (fig. 51). This embryo (*miracidium*) escapes from the eggshell only when exposed to light and in case the water is not below 15° C. Swimming around in the water it enters certain snails (*Physa alexandrina* Bourg. and *P. micropleura* Bourg.) establishing itself in the visceral cavity. Here it develops into a *sporocyst* (fig. 52) which, when about fifteen days old, measures 0.7 mm. long by 0.15 mm. broad; a generation

of *rediae* (fig. 53) develops in the sporocyst; the rediae escape from the latter in about fifteen days; a second generation of rediae (fig. 54) forms within the first rediae, escaping by the birth opening; a third generation of rediae may develop within the second. The *cercariae* (fig. 55) form in the rediae and are born at an early stage of development; when fully developed these cercariae escape from the snail and swim around in the water. The entire cycle to this point is evidently completed in less than two months. The cercaria (*Cercaria pigmentata*) is oval, 0.5 mm. long by 0.33 mm. broad with a tail about 0.9 mm. long; body opaque, due

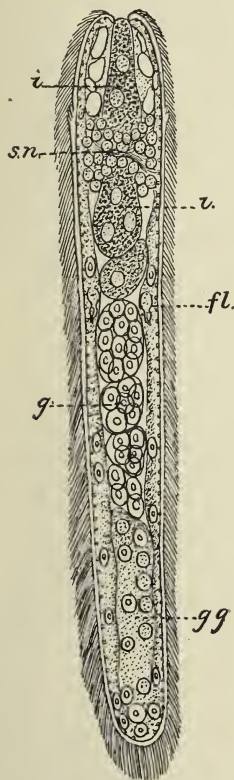


FIG. 51.—Dorsal view of the free embryo (*miracidium*) of the Conical Amphistome (*Amphistoma cervi*) about to enter the intermediate host: *fl*, end portion of excretory system; *g*, germ cells; *gg*, matrix of germ cells; *i*, rudimentary intestine; *sn*, nervous system.  $\times 285$ . (After Looss, 1896, Pl. XII, fig. 125.)

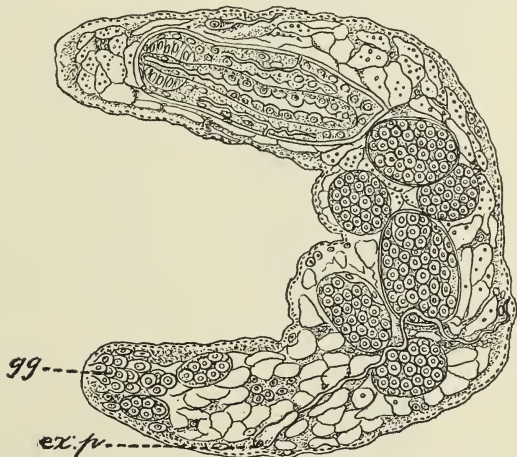


FIG. 52.—Sporocyst of the Conical Amphistome resulting from the transformation and development of the embryo, age about 15 days: *ex. p*, excretory pore. *gg*, matrix of germ cells. The large balls of cells represent developing rediae of the next generation.  $\times 170$ . (After Looss, 1896, Pl. XII, fig. 126.)

to pigment and to certain subtegumentary cells; oral sucker spherical, 45  $\mu$  in diameter; acetabulum 90  $\mu$  in diameter; two eye-spots present. The cercariae encyst themselves on plants and various other objects and evidently gain access to the final host (cattle, sheep, etc.) through the drinking water.

The Conical Fluke seems to have a very wide distribution, being recorded in Europe, Asia, Africa, North America, and South America. As yet it has not been recorded in the United States, but specimens collected in Canada have been sent to us by Professor Wright, and we may expect to find the same worms any day in the United States.



There is considerable difference of opinion among authors as to whether these parasites are injurious to the animals in which they occur. While some writers state that they are absolutely harmless, others claim that they cause an irritation in the stomach, and that

cattle which are heavily infested with them gradually emaciate. According to an Australian paper, the parasites cause a considerable number of deaths among the cattle of the coast districts; they occur in great numbers and injure cows more than steers or oxen. Attaching themselves to the mucous membrane of the stomach, by means of their suckers they raise the epithelium in form of papillae. The treatment is the same as for adult tapeworms (see p. 133).

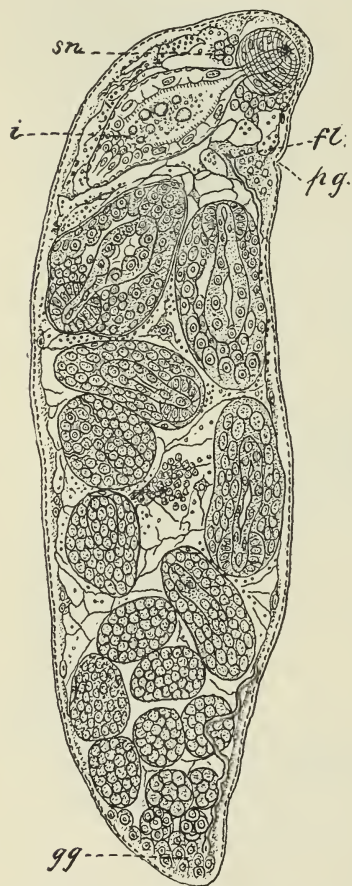


FIG. 53.—Adult redia of the Conical Amphistome (*Amphistoma cervi*) of the first generation, thirty-nine days after the infection of the intermediate host with embryos: *fl*, end portion of excretory system; *gg*, matrix of germ cells; *i*, rudimentary intestine; *pg*, birth opening; *sn*, nervous system. (After Looss, 1896, Pl. XII, fig. 129.)

tell what moment we shall find them introduced, perhaps with animals imported for menageries. Should they be introduced in this manner and find the conditions necessary to the development of their larval stages, they would, in all probability, develop in our American cattle. As this day has not yet come, they will simply be mentioned here by name and figured. For anatomical characters, compare the figures with the key on page 21.

#### ABATTOIR INSPECTION.

The amphistomes of cattle are of no importance in meat inspection, as they are not transmissible to man in any stage of their development. In fact, according to Schweinfurth, these parasites are collected by the natives of Africa and eaten raw.

Several other amphistomes are found in various allied ruminants used for food in certain countries, and although these parasites have not yet made their appearance in this country, we can not



FIG. 54.—Young redia of the Conical Amphistome of the second generation in which the cercariae develop.  $\times 170$ . (After Looss, 1896, Pl. XII, fig. 130.)

10. <sup>1</sup> *Amphistoma erplanatum* Creplin is described from the liver and gall bladder of the zebu; von Linstow (1878, p. 49) cites it as a parasite of cattle; Railliet cites it from the Indian buffalo and the zebu.

11. <sup>2</sup> *Amphistoma bothriophorum* Braun (fig. 56) also occurs in the stomach of the zebu.

12. *Amphistoma tuberculatum* was reported by Cobbold (1875, p. 819) from the intestine of the Indian oxen; but no description of the parasite has ever been given, so that the form may be ignored.

13. <sup>3</sup> *Gastrothylax crumenifer* Creplin. This parasite (figs. 57-62) is said to occur in most of the bovine animals (the zebu) killed at Son-Tay; its natural habitat is the stomach, and when present in large numbers they irritate the mucous lining and lead to an extreme emaciation of their host. The same parasite was once found at Leipsic, Germany, in a cross between the zebu, gayal, and yak; and von Linstow (1878, p. 49) cites it among the parasites of cattle.

14. <sup>4</sup> *Gastrothylax Cobbolaii* Poirier (fig. 63) was described from the stomach of the gayal from Java.

15. <sup>4</sup> *Gastrothylax elongatum* Poirier (fig. 64) was described from the stomach of the gayal from Java, and Railliet (1893, p. 379) reports that it has been found in Paris in the stomach of a zebu.

16. <sup>5</sup> *Gastrothylax gregarius* Looss (figs. 65 and 66) is found in enormous numbers in the rumen of nearly all the Indian buffaloes slaughtered in Alexandria, Egypt. In one buffalo Looss

counted 1,758 specimens on a portion of the mucosa as large as a hand. They were often found associated with *Amphistoma cervi*.

17. <sup>4</sup> *Homalogaster paloninae* Poirier (fig. 67) is found in the caecum of the gayal in Java.

18. <sup>6</sup> *Homalogaster Poirieri* Giard & Billet is found in the large intestine of Tonkin

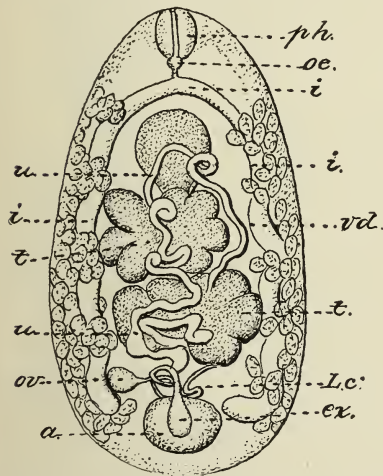


FIG. 56.—*Amphistoma bothriophorum*: a, position of acetabulum; ex, terminal vesicle of excretory system; i, intestinal caeca; Lc, Laurer's canal; oe, oesophagus; ov, ovary; ph, pharynx; t, testicles; u, uterus; vd, vas deferens.  $\times 5$ . (After Otto, 1896, p. 102, fig. 5.)

cattle (= ? the zebu). It fixes itself by means of the acetabulum to the mucosa and is sometimes present in large numbers.

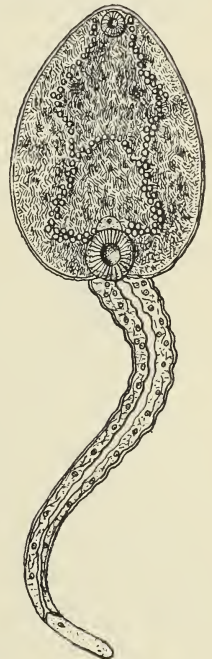


FIG. 55.—Mature cercaria of the Conical Amphistome (*Amphistoma cervi*), the stage which gains access to cattle and sheep.  $\times 75$ . (After Looss, 1896, Pl. XII, fig. 133.) See p. 65.

<sup>1</sup> For original description, see Creplin, 1847, pp. 34 and 35.

<sup>2</sup> For technical discussion, see Otto, 1896, pp. 101-105.

<sup>3</sup> *Amphistoma crumeniferum* Creplin, 1847; *Gastrothylax crumeniferum* (Creplin) Poirier, 1883; *G. crumenifer* (Creplin) Otto, 1896. For bibliography and technical discussion, see Otto, 1896, pp. 94-97.

<sup>4</sup> For technical discussion, see Poirier, 1883, pp. 73-80.

<sup>5</sup> For technical discussion, see Looss, 1896, pp. 5-13, 170-177.

<sup>6</sup> For original description, see Giard & Billet, 1892, pp. 614 and 615.

## TAPEWORMS, OR CESTODES (Order Cestoda).

[Segmented Tapeworms (suborder *Tomiosoma*). Tapeworms without four retractile probosces (tribe *Atrypanorhyncha*). Tapeworms with four suckers (subtribe *Tetrassichiona*).]

## Family TAENIIDAE.

In cattle and sheep we find both of the stages of tapeworms mentioned on page 21, namely:

*Larval forms* (cystic worms, bladder worms, hydatids) which live in the muscles or parenchymatous organs, but not in the intestine. They render the meat unfit for food since they are transmissible (according to the species) to man and dogs; and—

*Adult worms* (tapeworms, strobilae) which occur in the intestines of sheep and cattle (rarely in the ducts of the liver of sheep) and are not transmissible to carnivorous animals.



FIG. 57.—Enlarged dorsal view of *Gastrothylax crumenifer*. (After Creplin, 1847, Pl. II, fig. 1.) See p. 67.

Hogs on the other hand appear to be infested only with larval tapeworms, although three isolated cases of adult tapeworms have been recorded for them. These three cases may have been accidental occurrences, the hogs having possibly become accidentally infested with worms which normally live in other animals.



FIG. 59.—Enlarged view of anterior extremity of *Gastrothylax crumenifer*: m, mouth; vp, opening to ventral pouch. (After Creplin, 1847, Pl. II, fig. 4.) See p. 67.

Tapeworms of the family Taeniidae possess the following characters: The anterior extremity is represented by a more or less knob-like portion known as the *head*; this is followed by an unsegmented portion, the *neck*; head and neck together form the *scolex*; this in turn by the *segments*, or *proglottids*. The head is provided with four cup-shaped suckers, which are never provided with hooks in any form known in cattle, sheep, or hogs, but are armed with numerous hooklets in some of the forms found in certain other animals (man, rabbits, birds). The apex of the head is provided with a muscular body, which develops into different forms in the various subfamilies. It may form a *rostellum*, which may be unarmed (*Taenia saginata*) or armed (*Taenia solium*). In the larval forms discussed in this paper (*Taeniinae*) the rostellum protrudes at the center of the apex, but in some other forms (*Dipylidiinae*) it may retract into a rostellum sac. In the adult tapeworms (*Anoplocephalinae*) of cattle, sheep, etc., the muscular body is composed of stellate fibers which move the suckers, but these fibers do not appear to form a true rostellum.

The *neck* is very simple in structure, containing each side two longitudinal canals and a longitudinal nerve trunk. At the posterior portion of the neck, segments form by transverse division.

The *segments* increase in size, gradually becoming larger the farther they are from the head; reaching a maximum breadth, they decrease in width, and then increase in length more rapidly. The anterior segments are the youngest, the posterior seg-



FIG. 58.—Enlarged ventral view of *Gastrothylax crumenifer*: a, acetabulum; vp, opening to the ventral pouch. (After Creplin, 1847, Pl. II, fig. 2.) See p. 67.



FIG. 60.—Enlarged view of posterior extremity of *Gastrothylax crumenifer*. See p. 67.



ments the oldest. Many zoologists look upon the entire tapeworm as a colony of animals, each separate segment representing a single individual, and all segments being descended from a single animal represented by the head and neck.

Owing to their parasitic life, tapeworms are very degraded in their structure. The *digestive tract* is entirely absent, the worms taking their nourishment by osmosis through their entire surface. The *nervous system* is composed of nerve centers (ganglia), situated in the head, and two large lateral nerves, one of which extends on each side of the worm from the head to the posterior end of the strobila; in some cases, at

least, the lateral nerves are connected by two transverse nerves at the distal end of each segment. The *excretory system* consists of two dorsal and two ventral longitudinal lateral canals, which are connected in various ways in the head; the *ventral canals* are connected by *transverse canals* at the posterior border of each segment. The *genital organs* form by far the most important organ system in the animal. In the first place, the entire genital system is repeated, so that each segment as it arrives at a given age possesses its own genital organs, independent of the organs of the other segments. Again, every segment is hermaphroditic, containing both male and female organs, and in some genera the segments are doubly hermaphroditic, containing double sets of male and of female organs. The *male organs* consist of a cirrus (penis), a cirrus pouch, a vas deferens, and numerous testicles. The *female organs* consist of a vulva, a vagina, an ovary, a vitellogene gland, a shell gland, oviducts, and a uterus. Each segment possesses one or two genital pores, the cirrus and the vulva of any given set of organs

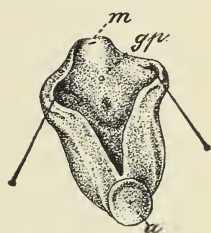


FIG. 61.—Enlarged view of *Gastrothylax crumenifer*, with ventral pouch open: *a*, acetabulum; *gp*, genital pore; *m*, mouth. (After Creplin, 1847, Pl. II, fig. 5.) See p. 67.

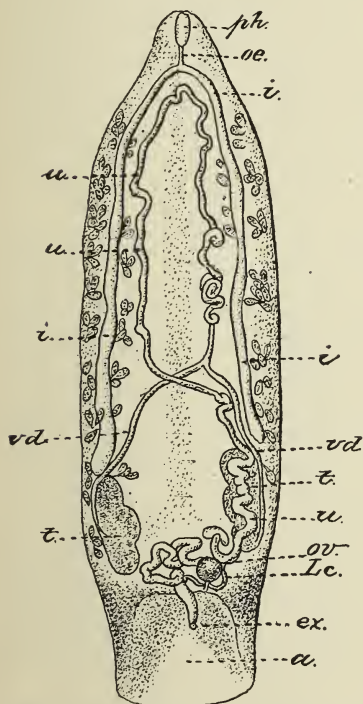


FIG. 62.—Dorsal view of *Gastrothylax crumenifer*, magnified to show the anatomical characters: *a*, acetabulum; *ex*, terminal vesicle of excretory system; *i*, intestinal caeca; *Lc*, Laurer's canal; *oe*, oesophagus; *ov*, ovary; *ph*, pharynx; *t*, testicles; *u*, uterus; *vd*, vas deferens.  $\times 5$ . (After Otto, 1896, p. 96, fig. 3.) See p. 67.

(except in the genus *Amabilia*, according to Diamare) opening at the same pore. In some species, so-called *interproglottidal* glands of unknown function are found between the segments.

*Life history.*—Tapeworms pass through three stages of development, known as the *oncosphere* (or embryo), the larva (a bladder worm known as a *cysticercus*, a *coenurus*, an *echinococcus*, or a *cysticercoid*), and an adult form known as the *strobila*. A change of host is necessary for their development; the host in which the oncosphere develops into the larva is known as the *intermediate host*,

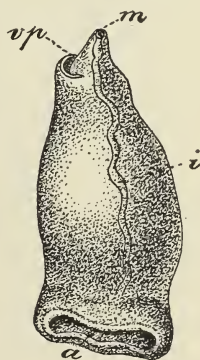


FIG. 63.—*Gastrothylax Cobboldii*, lateral view: *a*, acetabulum; *i*, intestine; *m*, mouth; *vp*, opening to ventral pouch. (After Poirier, 1883, Pl. II, fig. 3b. Taken from Braun, Vernes, Pl. XVIII, fig. 2.) See p. 67.

while the animal which harbors the adult form is known as the *final host*. The life history of *Taenia saginata* given on page 72 may be taken as typical for the family.

All of the larval cestodes of cattle, sheep, and swine belong to the subfamily *Taeniinae*, while all the adult forms found in these hosts are classified in the subfamily *Anoplocephalinae*.

### Hard-shell Tapeworms (Cestodes of the Subfamily *Taeniinae*).

The Hard-shell Tapeworms, so called because of the thick striated eggshell (embryophore), are found as adults in the intestines of meat-eating mammals, while their larval stage is found in the muscles or parenchymatous organs of herbivorous and omnivorous animals. These larval forms are very important from the standpoint of meat inspection, and organs which harbor them should be excluded from the market or should be rendered wholesome before being placed on sale.

The larval forms may be of three kinds, as follows:

(1) *Cysticercus* (figs. 68 and 76).—This is the most simple form. The parasite consists of a cyst, which is invaginated at a given point. There is normally only one invagination to each cyst, and at the base of the invagination is situated the head of the future tapeworm. Besides the invagination, the cyst contains more or less liquid.

(2) *Coenurus* (figs. 99 and 100).—In this case there is a considerable number of invaginations, each containing a head.

(3) *Echinococcus* (fig. 105).—In the third type there is no invagination of the cyst wall, but brood capsules are formed from the parenchyma of the cyst and several heads are formed in each brood capsule.

Attempts have been made to subdivide the *Taeniinae* into genera and subgenera, the genus *Taenia* Linnaeus being retained for the forms which possess a *Cysticercus* or a *Coenurus* as larval form, while *Echinococcifer* Weinland, 1861, has been proposed as the generic name for *Taenia echinococcus*. This generic division has not been accepted by the majority of helminthologists, most workers preferring to recognize

only one genus, *Taenia*, but many authors admitting three subgenera, corresponding to the three types of larvae.

### HARD-SHELL TAPEWORMS (Genus *Taenia*).

The following species of this genus must be considered in this report:

Adult.		Larva.	
Name.	Host.	Name.	Host.
<i>Taenia saginata</i> .....	Man .....	<i>Cysticercus bovis</i> .....	Cattle.
<i>Taenia solium</i> .....	Man .....	<i>Cysticercus cellulosae</i> .....	Swine and man.
<i>Taenia marginata</i> .....	Dogs .....	<i>Cysticercus tenuicollis</i> .....	Cattle, sheep, and swine.
<i>Taenia coenurus</i> .....	Dogs .....	<i>Coenurus cerebralis</i> .....	Cattle and sheep.
<i>Taenia echinococcus</i> .....	Dogs .....	<i>Echinococcus polymorphus</i> .....	Cattle, sheep, swine, man, etc.

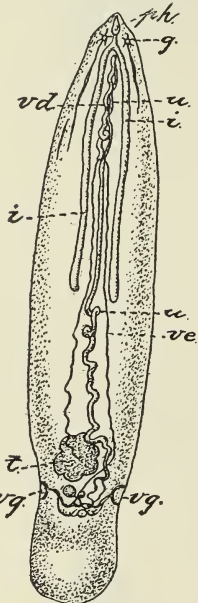


FIG. 64.—*Gastrothylax elongatum*: g, ganglion; i, intestinal caeca; ph, pharyngeal bulb; t, testicle; u, uterus; vd, vas deferens (ductus ejaculatorius); ve, vasa efferentia; vg, vitellogene glands. (After Poirier, 1883, Pl. II, fig. 2b. Taken from Braun, Vermes, Pl. XVIII, fig. 7.) See p. 67.

19. Beef Measles (*Cysticercus bovis*) of Cattle, and its adult stage, The Unarmed, or Beef Measle, Tapeworm (*Taenia saginata*) of Man.

[Figs. 68-74.]

LARVAL STAGE (*Cysticercus bovis*).

For anatomical characters, compare fig. 68 with key, p. 21.

SYNONYMY.—*Cysticercus Taeniae saginatae* Leuckart, 18—(?); *C. bovis* Cobbold,

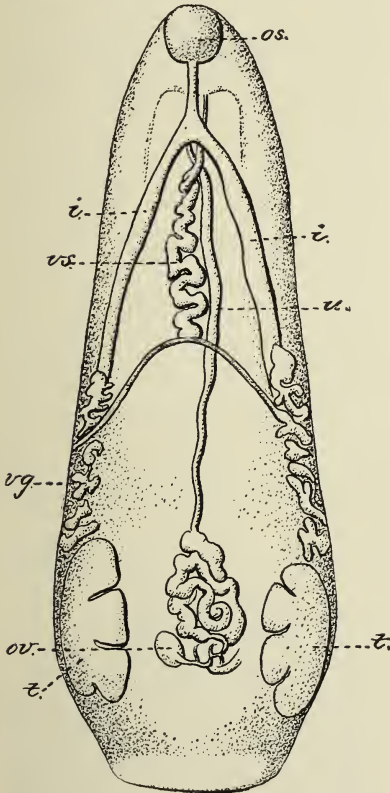


FIG. 65.—Dorsal view of *Gastrothylax gregarius*: *i.*, intestinal caeca; *os.*, oral sucker; *ov.*, ovary; *t.*, testicles; *u.*, uterus; *vg.*, vitellogene glands; *vs.*, vesicula seminalis.  $\times 9$ . (After Looss, 1896, fig. 1.) See p. 67.

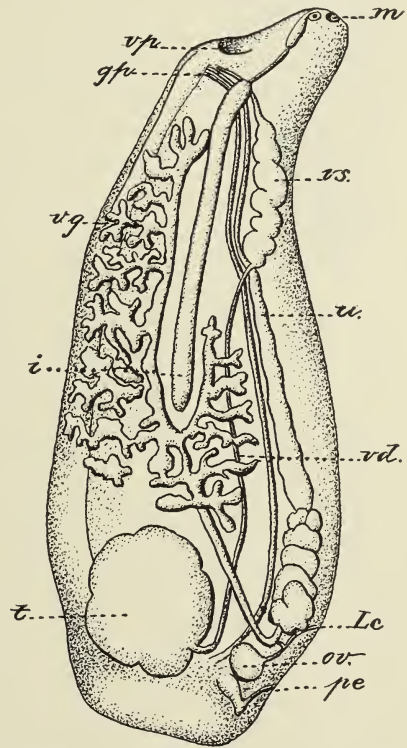


FIG. 66.—Lateral view of *Gastrothylax gregarius*: *gp.*, genital pore; *i.*, intestinal caeca; *m.*, mouth; *Lc.*, opening of Laurer's canal; *ov.*, ovary; *pe.*, excretory pore; *t.*, testicle; *u.*, uterus; *vd.*, vas deferens; *vg.*, vitellogene gland; *vs.*, vesicula seminalis.  $\times 9$ . (After Looss, 1896, fig. 2.) See p. 67.

1866; *C. Taeniae mediocanellatae* Knoch, 1868; *C. inermis* of various Germans and others, 18—(?); "*Cysticerkus*" *bovis* of Schneidemühl, 1896.

HOSTS.—Cattle, Rocky Mountain "antelope," llama, and giraffe. (See pp. 137-143.)

ADULT STAGE (*Taenia saginata* (Goeze, 1782)).

For anatomical characters, compare figs. 69-73 with key, p. 84.

SYNONYMY (see also pp. 89-90).—*Taenia solium* Linnaeus, 1758, pro parte; *T. cucurbitina* Pallas, 1781, pro parte; *T. cucurbitina* Art [= var.] *saginata* Goeze, 1782; *T. cucurbitina*, *grandis*, *saginata* Goeze, 1782; *T. solitaria* Leske, (1785), pro parte; *Halysis*



*solium* (Linnaeus) Zeder, 1803, pro parte; *Pentastoma coarctata* Virey, 1823; "*T. dentata*" Nicolai, (1830) [nec Batsch, 1786]; "*T. lata*" Pruner, 1847 [nec Linnaeus, 1758]; *Bothriocephalus tropicus* Schmidt Müller, 1847; *T. mediocanellata hominis*, seu *T. mediocanellata* seu *T. zittaviensis* Küchenmeister, 1852; *T. solium* var. *mediocanellata* (Küchenmeister) Diesing, 1854; *Taeniarhynchus mediocanellata* (Küchenmeister) Weinland, 1858; (?) *Taenia solium* var. *abietina* Weinland, 1858; *T. inermis* Moquin-Tandon, 1860; *T. mediocanellata* (?-), date (?), see Moquin-Tandon, 1860; *T. tropica* (Schmidt Müller) Moquin-Tandon, 1860; *T. megaloon* Weinland, (1861); *T. (Cystotaenia) mediocanellata* of Leuckart, 1863; *T. saginata* (Goeze, 1782) of Leuckart, 1867; (?) *T. abietina* Weinland of Davaine, 1873; *T. inermis* Laboulbène, 1876; *T. algérien*, Redon, 1883; (?) *T. solium* var. *minor* Guzzardi Asmundo, 1885; *T. algériensis* Braun, 1894 (= *T. algérien* Redon renamed).

ANOMALIES.—(?) "*Taenia vulgaris*" Werner, 1782 [nec Linnaeus, 1758] = *T. dentata* Batsch, 1786; (?) *T. fenestrata* Chiaje, 1833; *T. capensis* Moquin-Tandon, 1860; *T. lophosoma* Cobbold, 1866; *T. fusa*, *T. continua*, *T. solium fusa* seu *continua* Colin, 1876; *T. mummificata* Guzzardi Asmundo, 1885; *T. nigra* Davaine, 1877; *T. inermis fenestrata* Maggiora, 1891.

PRE-LINNAEAN NAMES.—*Vermis cucurbitinus* composing *Taenia longissima* Plater, 1609; *Lumbricus latus* Movfetius, (1634); *Taenia secunda* Plateri Ernst, 1659; *Lumbricus latus* Tyson, 1683; *Solium* ou *Ténia sans épine* Andry, (1700); *Taenia de la seconde espèce* Andry, 1718; *Taenia sans épine* ou *Taenia de la première espèce* Andry, 1741.

FIG. 67.—*Homalogaster paloninae*, ventral view. (After Poirier, 1883, Pl. II, fig. 1a. Taken from Braun, Vermes, Pl. XVIII, fig. 3.) See p. 67.

BIBLIOGRAPHY.—For bibliography, see Huber (1892). For technical discussion, see Leuckart (1880, pp. 513-616); R. Blanchard (1886, pp. 315-382).

HOST.—Man.

*Life history*.—Starting with the adult tapeworm (fig. 69) in the intestine of man, the life history of the parasite, the knowledge of which we owe to Rudolf Leuckart, is as follows: The eggs (fig. 74) escape from the uterus and are passed with the excreta, or the segments containing eggs break loose from the tapeworm and either wander out of the intestine of their own accord or are passed with the excreta. In either case the eggs become scattered upon the ground or in water, and reach the cattle through their drinking water or with the fodder. When whole segments (generally several together) are passed, these crawl around on the ground or herbage, and cattle by swallowing them may become infected with numerous eggs at the same time. Upon arriving in the stomach, the eggshells are destroyed; the embryo then bores its

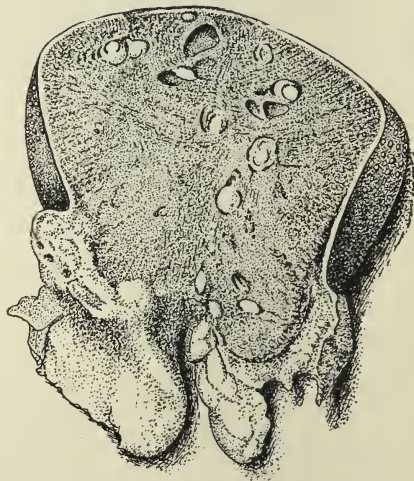
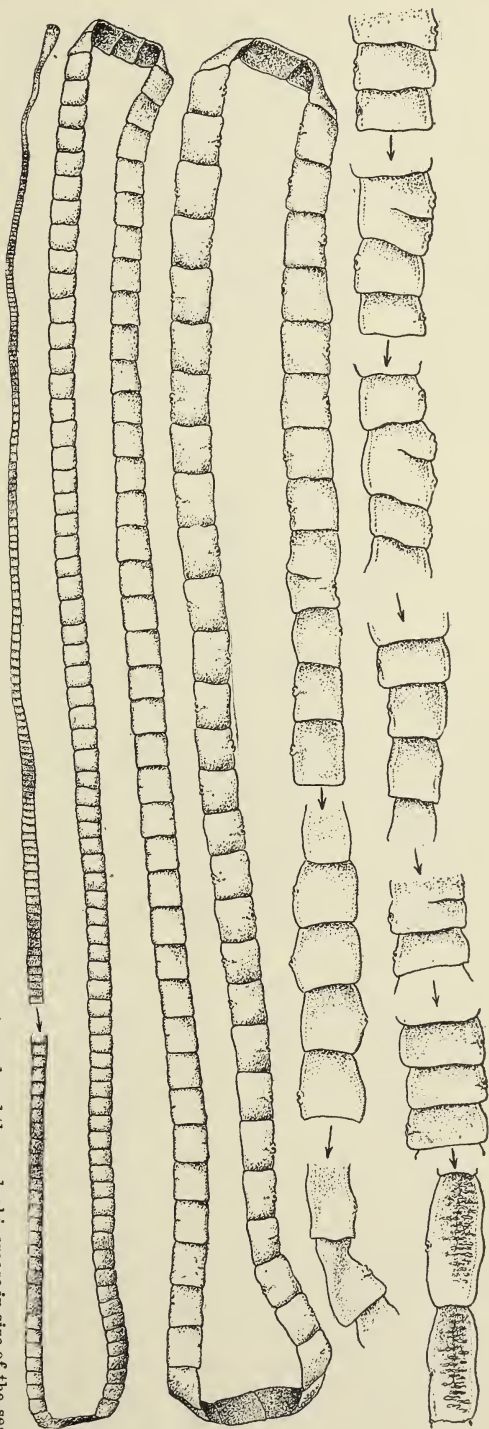


FIG. 68.—Section of a beef tongue heavily infested with beef measles, natural size (original).

way through the intestinal walls with the aid of its six minute hooks, and wanders to the muscles where it comes to rest; or if it bores into a blood vessel, it may be carried with the blood to any organ of the body. When the embryo comes to rest it loses its hooks, and, increasing in size, develops into a small round bladder worm. The head of the future tapeworm is then developed in an invagination of the cyst wall, and the complete organism (fig. 68) thus formed is known as a *cysticercus*, or bladder worm. During its development the cyst pushes the tissues of the host aside to make room for itself and an outer cyst is formed around it, made up of connective tissue of the host. The total time consumed in the development of the *cysticercus* from the embryo is variously estimated from seven to eighteen weeks.

Hertwig states that the larva has completed its development in eighteen

FIG. 68.—Several portions of an adult Beef-meat Tapeworm (*Taenia saginata*) from man, showing the head on the anterior end and the gradual increase in size of the segments, natural size (original).



weeks, and gives the following table to determine the age<sup>1</sup> of the cysticercus:

Age in weeks.	Entire cyst.	Cysticercus without connective tissue cyst.	Scolex.	
			Natural size.	Stretched.
4.....	4.0 by 3.5 mm.....	2.25 by 2.25 mm.....	0.5 by 0.5 mm.....	0.7 mm. long.
6.....	4.2 by 3.5 mm.....	3 by 2.5 mm.....	1 by 1 mm.....	1.3 mm. long.
8.....	4.5 by 3.5 mm.....	3.25 by 2.75 mm.....	1.5 by 1 mm.....	2.9 mm. long.
10.....	5 by 3.75-4 mm.....	3.5 by 3.5 mm.....	1.75 by 1 mm.....	3.3 mm. long.
12.....	5.6 by 3.5-4 mm.....	4 by 4 mm.....	1.8 by 1 mm.....	3.5 mm. long.
14.....	6 by 4.5 mm.....	5 by 4.5 mm.....	2 by 1 mm.....	4 mm. long.
16.....	6 by 4.5 mm.....	5 by 4.5 mm.....	2 by 1 mm.....	4.25 mm. long.
18.....	6.25-7 by 4.5 mm.....	6 by 4 mm.....	2 by 1.25 mm.....	5 mm. long.
22.....	6.5-8 by 4.5 mm.....	6 by 4.5 mm.....	2.25 by 1.75 mm.....	5.5-6.25 mm. long.
28.....	7.5-9 by 5.5 mm.....	7 by 5 mm.....	2.5 by 2 mm.....	7 mm. long.

The calcareous bodies may appear when the bladder worm is four weeks old; the suckers are fully developed at the eighteenth week.

Occasionally bladder worms are found measuring 10 to 12 mm., with a scolex 8 to 9 mm.; these parasites are more than 28 weeks old. If the infested animal is not slaughtered and does not die the cysts will eventually die and degenerate. Thus, in one animal killed 224 days after being infected with tapeworm eggs, the cysts were calcified (Saint-Cyr). The parasites which inhabit the seats of predilection (see p. 78) seem to be the last to die. The degeneration may include (1) the surrounding connective tissue capsule, which becomes opaque and thickened, (2) the bladder cyst of the worm, which turns to a yellowish green, soft, cheesy mass, or (3) both. If, however, the animal is slaughtered before the cysticerci become calcified, and the meat used for food, the cyst around the hydatid is digested upon arriving in the stomach of

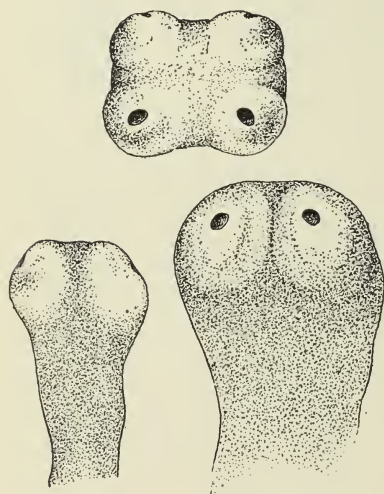


FIG. 70.—Dorsal, apex, and lateral views of the head of Beef measles Tapeworm (*Taenia saginata*), showing a depression in the center of the apex.  $\times 17$ . (Original.)

<sup>1</sup> During the proof reading of this report an article by Ostertag (1897, pp. 1-4) has reached us, in which he adds some details of value in judging the age of the bladder worms. His chief results may be summarized as follows:

(1) A steer may become infected with beef measles, and yet recover from the attack without showing upon post-mortem any calcified cysts. (2) *C. bovis*, 18 days old, is spindleform, and measures 4 mm. long by 2 mm. broad; a differentiation into scolex and bladder is not yet present. (3) Up to 33 days after infection the parasite is surrounded by a cheesy mass, the result of exudation; this afterward disappears. (4) At 25 days old the parasite shows the primordium of the scolex, with faint indication of the suckers. (5) When the parasite is 59 days old the suckers may be seen with the naked eye; calcareous corpuscles are also present. (6) The lumen of the suckers is visible in parasites 73 days old.



man. The hydatid cyst is also digested, the head and neck alone remaining uninjured. The scolex then passes from the stomach into the small intestine, fastens itself to the wall by means of its suckers, and gives rise to segments by transverse division (strobilization) directly back of the head and neck. New segments are formed between the head and the old segments, so that the last segment is always the oldest and the segment nearest the head always the youngest. Segments are formed so rapidly that the worm is full grown at the end of about three months. Perroncito estimates that about 13 to 14 new segments are formed each day, length of the the first month Genital organs, segment, em completed to the

which results in an average increase in the worm at the rate of about 3 cm. per day for and 14 cm. per day for the second month. both male and female, are developed in every bryos are produced, and the life cycle is point from which we started out.

#### BEEF MEASLES.

cattle.—*Cysticercus bovis* has been found in etal muscles, in the heart, the adipose tissue around the kidneys, the subperitoneal connective tissue, the lymphatic glands, and between the convolutions of the brain; cases are also reported of its presence in the lungs and liver.

In some infections of cattle which have been made no symptoms of disease were noticed, but in others quite severe symptoms have been observed. About fifteen to twenty days after infection the animals became feverish, the sickness increasing to the twenty-fifth to sixtieth day, the patients becoming emaciated. Several cases

The disease in cattle in the skel

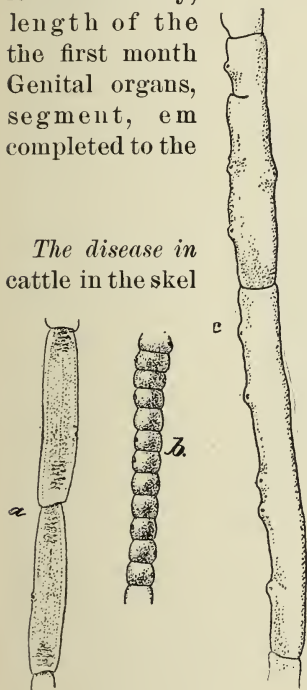


FIG. 71.—Segments from various strobilae of Beef-measle Tapeworm (*Taenia saginata*) showing forms of proglottids which are occasionally found: a, elongated segments; b, beadlike segments; c, a portion of strobila in which the segmentation is not distinct; d, moniliform segments (a and b original; c and d after R. Blanchard, 1894).

proved fatal, while others recovered and were apparently none the worse for the experiment.

These symptoms have been noticed only in cattle which have been experimented upon and which have received enormous infections, and it is very generally supposed that an ordinary infection will have little or no effect upon the animals; we can, however, easily imagine that such an infection as Fleming describes, where he found 300 cysticerci in one pound of muscle, will injure the host. When the heart is heavily infected its action must be seriously impeded. As an example

of an extreme case we may take the following description of symptoms and post-mortem examination, taken from Ziirn (1882, p. 187):

*Symptoms.*—Four days after feeding segments of *T. saginata* to a healthy three-months-old calf, the patient showed a higher temperature (the normal temperature was 39.2 C.) The calf ate but little on that day, showed an accelerated pulse, swollen belly, staring coat, and upon pressure on the sides showed signs of pain. The next day the animal was more lively, ate a little, and for nine days later did not show any special symptoms except pain on pressure of the abdominal walls, and a slight fever. Nine days after the infection the temperature was 40.7 C., pulse 86, respiration 22; the calf laid down most of the time, lost its appetite almost entirely, and groaned considerably. When driven it showed a stiff gait and evident pain in the side. The fever increased gradually and with it the feebleness and low spirited-

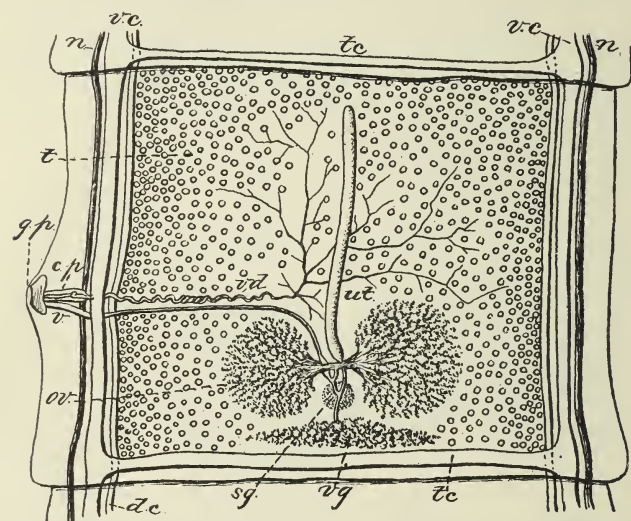


FIG. 72.—Sexually mature segment of Beef-measle Tapeworm (*Taenia saginata*): cp, cirrus pouch, with cirrus; dc, dorsal canal; gp, genital pore; n, lateral longitudinal nerves; ov, ovary; sg, shell gland; t, testicles; ut, median uterine stem; v, vagina; vc, ventral canal, connected by transverse canal; tc; vd, vas deferens; vg, vitellogene gland, enlarged (in part after Leuckart).

ness of the calf, which now retained a recumbent position most of the time, being scarcely able to rise without aid, and eating only mash with ground corn. Diarrhea commenced, the temperature fell gradually, and on the twenty-third day the animal died. The temperature had fallen to 38.2 C. During the last few days the calf was unable to rise; in fact, it could scarcely raise its head to lick the mash placed before it. Pulse was reduced by 10 beats. On the last day the heart beats were

very much slower, yet firm, and could be plainly felt. Several days before death the breathing was labored and on the last day there was extreme dyspnoea. \* \* \*

*Post-mortem.*—Body cavities contained reddish serous exudate. Subdermal connective tissue was oedematous. Muscles were redder than usual, in some places very dark red. In the heart muscles were innumerable (many thousand) round tubercle-like bodies, 1.5 to 3 mm. long, 1.2 to 5 mm. wide, yellowish-white in color. Young cysticerci lay embedded in these smeary chalky cysts. Some of these cysticerci were round, but the majority were bottle-shaped and contained round cells and fat globules, and were inclosed by a membrane.

The bottle-shaped cysticerci measured 0.557 mm. long while their greatest diameter was 0.326 mm. Cysts were also found in all the muscles, especially in the muscles of mastication, dorsal muscles of the neck, etc., and finally, though not many, in the diaphragm, and outer and inner diagonal abdominal muscles.

Acute cestode tuberculosis is a name which is sometimes applied to designate a heavy infection with cysticerci.

Failing to diagnose the presence of the parasites by symptoms exhibited by the cattle, we have recourse to other methods which have occasionally proved of use:

(1) By examining the under side of the tongue it is occasionally possible to find small lumps about the size of a pea or bean which can be moved slightly with the fingers, and which in many cases represent cysticerci. It is rare that this method leads to any practical results, and no confidence should be placed in it.

(2) Several authors suggest cutting out a portion of muscle—one of the neck muscles, for instance—and examining it for the cysts. Although the diagnosis may sometimes be made by operating in this manner, we can hardly see how it can be of any practical value, since no treatment, except good nourishment, which cattle should always have, can at present be suggested for animals infested with these parasites. Moreover, extirpation of a muscle should be practiced only by professionals, and a negative diagnosis in this case is of no value.

(3) The only positive diagnosis is post-mortem examination, and this, for the comfort of man, as will be shown, should be made on all slaughtered cattle. An examination of the internal and external muscles of the jaws, the tongue and neck, as well as the heart and muscles seen from the body cavity, will generally suffice to determine whether the cysticerci are present or not.

*Treatment.*—There is no medical treatment to be suggested. *Prevention*, however, is extremely simple. We have seen (p. 72) that cattle obtain the eggs directly or indirectly from human excrements; hence persons who have this tapeworm should not void their excrements in fields or barns where they can contaminate the fodder or water used for cattle. If this plan is followed, not only will the spread of the parasite among cattle be prevented, but also the spread of this species of tapeworm among man, since the latter, as has already been stated, becomes infected by eating meat containing the larval stage. It lies entirely within the power of the inhabitants in stock-raising districts to prevent the infection of their cattle with this parasite.

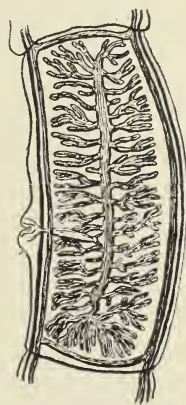


FIG. 73.—Gravid segment of Beef-measle Tapeworm (*Taenia saginata*), showing lateral branches of the uterus, enlarged (original).

#### ABATTOIR INSPECTION.<sup>1</sup>

As beef measles, when swallowed by man, gives rise to an adult tapeworm, the question of using meat infested with this parasite and

<sup>1</sup> Since this report was sent to press we have received a very extensive article upon abattoir inspection for beef measles, written by Rasmussen (1897), of Copenhagen. Persons who wish to inform themselves upon this subject more in detail are referred to the articles by Rasmussen (1897) and Friis (1897).



the question of abattoir inspection naturally arise. Although this species of tapeworm does not contribute to the comfort of man, it can not be looked upon as a dangerous parasite. It may bring about digestive troubles, but will not per se result in the death of the patient; and with proper treatment it can be gotten rid of, although sometimes with difficulty. Nevertheless, its presence in man should, of course, be prevented when possible, and this can be done by very simple means, namely, (1) by an inspection of cattle at the slaughterhouses to determine the presence or absence of the larval stage, and (2) by submitting infested meat to processes which kill the parasites.

(1) *Position of the parasites.*—Inspectors should examine very thoroughly the muscles of all cattle slaughtered, especially the inner and outer muscles of mastication and the heart; cuts should be made into the muscles of the jaws parallel to the bones.

The following table, taken from Ostertag, giving the result of the meat inspection in Berlin for 1889–90, is exceedingly instructive, as it shows the general distribution of the parasites in the various muscles:

	Cases.
(1) In muscles of the jaws.....	316
(2) In muscles of the jaws and in the heart .....	39
(3) In muscles of the jaws and in the tongue.....	4
(4) In muscles of the jaws and in the neck.....	1
(5) In muscles of the neck.....	1
(6) In muscles of the neck and in the tongue.....	1
(7) In muscles of the tongue.....	2
(8) In muscles of the tongue and heart.....	2
(9) In muscles of the tongue and muscles of breast.....	1
(10) General infection.....	22

Thus it is seen that in these examinations the muscles of the jaws were infested 360 times, while the other organs were infested but 55 times (in this computation the 22 cases of general infection are omitted); in other words, in about seven-eighths of all cases found parasites were present in the muscles of the jaws. Occasionally, in very heavy infections, the parasites occur also in the lymphatic glands, the lungs, the liver, the brain, etc.

The recognition of the fully developed bladder worms is an easy matter for anyone who understands the structure of the parasite; although their detection in superficial layers is rendered somewhat difficult in case the surface of the meat becomes dried. In case of doubt the suspected *cysticercus* may be placed between two fingers and a gradual pressure exerted upon the cyst. This will cause the protrusion of the head, upon which the four suckers can be easily distinguished. A simple microscopic preparation of the parasite, made by pressing it between two pieces of glass, will reveal the presence of the calcareous corpuscles of the parenchyma.

*Differential diagnosis.*—The only parasites in cattle which would be likely to be mistaken for beef measles are *Cysticercus tenuicollis* (see

p. 96) and *Echinococcus polymorphus*. The absence of hooks, however, immediately distinguishes the Beef-measle Bladder Worm (*Cysticercus bovis*) from *C. tenuicollis*, which occurs in the serous membranes, etc., but not in the muscles. Young stages of the echinococcus hydatid, which are occasionally found in the muscles, differ from the Beef-measle Bladder Worm in several characters, which render a differential diagnosis comparatively easy, as seen from the following table:

<i>Cysticercus bovis.</i>	<i>Echinococcus</i> , p. 113.
One unarmed head present..	Head absent or numerous armed heads present in brood capsules (p. 116).
Cuticle thin.....	Cuticle thick and laminated (p. 116).
Form oval.....	Form round.

A positive diagnosis of the younger stages of *C. bovis* (i. e., before the head has developed), or of degenerated specimens, is sometimes more difficult; the younger stages and the totally degenerated specimens will not develop further if eaten; the specimens which are only partially degenerated may, however, still retain enough vitality to develop into adult tapeworms. The oval or pyriform body gives a probable diagnosis for the younger stages, while the presence of calcareous corpuscles (seen only with the microscope) furnishes a method of diagnosis for the degenerated forms. Even in completely degenerated cysts the calcareous bodies may be discovered; these should, however, not be mistaken for fat globules which are more strongly refractive, possess a broader and darker edge, and do not change on addition of acetic acid. It is more difficult to distinguish the calcareous corpuscles from certain crystals of calcium carbonate; the latter lie in clumps and overlap each other, and upon being treated with mineral acids (as weak hydrochloric acid) completely disappear, while when the calcareous corpuscles are treated with acids their organic base retains the original form.

Rissling gives the following method for determining the presence of cysticerci in chopped meat and sausage, but its application does not seem very practicable, for this country at least. It appears to us much better to inspect meat for measles before it is cut up.

Prepare 1 to 4 liters of a solution of caustic soda or caustic potash having a specific gravity of 1.15; place this, together with the teased or chopped meat, in a funnel-shaped dish, stir well and allow to stand. The worms will then sink to the bottom while the rest of the material will float.

Schmidt-Mülheim's method consists in artificially digesting the meat at 40° C. After several hours the bladder portion of the cysticerci will be more or less destroyed, but the heads will not be affected; they sink to the bottom of the vessel and may be recognized as small white bodies. In armed cysticerci (*C. cellulosae*, p. 89, etc.) the hooks will be found.

*Frequency of Cysticercus bovis in cattle.*—No exact statistics have been published for this country. The proportions of infected cattle slaughtered in Prussia for 1892 were as follows:

Regierungsbezirk.	Proportion.	Regierungsbezirk.	Proportion.
Stralsund.....	1:51	Kassel.....	1:1,653
Oppeln.....	1:229	Bromberg.....	
Hannover.....	1:350	Breslau.....	1:2,500
Lüneburg.....	1:426	Arnsberg.....	
Danzig.....	1:610	Koblenz.....	
Berlin.....	1:775	Stettin.....	1:3,500
Marienwerder.....	1:915	Posen.....	1:6,659
Frankfurt.....	1:1,025	Königsberg.....	1:20,000
Merseburg.....		Liegnitz.....	1:25,586
Schleswig.....		Düsseldorf.....	1:34,182
Potsdam.....		Wiesbaden.....	
Hildesheim.....			

The average proportion for the first 20 Regierungsbezirke mentioned was 1:1,631. These statistics appear rather low when we notice the following figures for the Berlin abattoir:

Year.	Cattle slaughtered.	Cattle infected.	Proportion.
1883-88.....		2	
1888-89.....	141,814	113	1:1,255
1889-90.....	154,218	390	1:395
1890-91.....	124,593	263	1:474
1891-92.....	136,368	254	1:541
1892-93.....	142,874	214	1:672

This apparent increase in proportion from 1:1,255 in 1888-89 to 1:672 in 1892-93 is due to the more thorough inspection following Hertwig's discovery of the seats of predilection of the parasite, rather than an actual increase in the number of animals infected.

*Influence of age and sex of the host.*—According to certain European statistics about 50 per cent of the cases of infection are found in animals 2 years old; about 20 per cent of the cases in animals 3 years old, and about 4.5 per cent in animals of 1, 4, 5, 6, 7, and 8 years old, respectively. Beef measles are also said to be more common in male animals than in female animals.

*Influence of season.*—According to Rasmussen, bladder worms are more common in late summer and early fall than at other times of the year. From statistics he gives for Copenhagen it appears that for the years 1890-96, the total number of cases found and their proportion to the entire number of animals slaughtered were as follows:

Months.	Cases.	Per cent.	Months.	Cases.	Per cent.
January.....	39	0.17	July.....	13	0.10
February.....	38	.19	August.....	52	.31
March.....	43	.20	September.....	69	.32
April.....	20	.10	October.....	81	.35
May.....	24	.12	November.....	54	.24
June.....	13	.09	December.....	38	.18



*Disposition of measly beef.*—Measly beef should be condemned to the tank as unfit for food when the infection is general, or when the invasion by the parasites has caused a watery and “flabby” condition of the meat. In case of light infection the meat can be used for food after the cysticerci have been rendered harmless, but even in these cases it is well to cut away the most heavily infested portions. Cases of so-called “single infection” should be treated the same as cases of light infection, for although it may unquestionably happen that an animal is infected with but one bladder worm, still the finding of only one parasite is no proof that other parasites are not present; furthermore, in a number of cases of alleged “single infection,” later and more thorough examination has revealed further worms.

In case of infection with only very young parasites, in which the suckers are not fully developed, the meat may safely be passed and allowed to go on the market without restriction.

In case of infection with fully developed live bladder worms, the meat should be subjected to some safeguarding method before being placed on the block, or it should be sold under declaration of its exact character.

Opinion differs as to the method which should be followed in case of infection with degenerated bladder worms. It is maintained by some that this meat should be allowed on the market without restrictions. The finding of degenerated cysts, or bladders, however, is no proof that all the parasites are dead, for

not only are cases more or less frequently found in which both live and degenerated bladders are present, but even if the cyst, or bladder, is degenerated the head may, in some cases, still retain its vitality. It is accordingly safer to treat carcasses with degenerated cysts in the same manner as carcasses with live cysts; and should any exception to this be made, such exception should be limited to cases in which the degenerated parasites are found in the muscles of the jaws.

The cysticerci may be killed by cooking, by salting or corning, or by cold storage.

*Cooking.*—This is the surest method of killing the parasites, but it is open to the serious practical objection that, according to estimates, cooking in a steam sterilizing apparatus results in a shrinkage of from 33 to 50 per cent, and this heavy loss will undoubtedly be a drawback to its general use.

Perroncito found that below 30° C. the movements of the worms are very slight, or practically nil; from 36° to 38° C. the movements are livelier; at higher temperature they diminish, ceasing at 44° C.; they

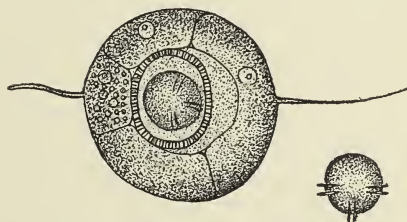


FIG. 74.—Egg of Beef-measle Tapeworm (*Taenia saginata*), with thick eggshell (embryophore), containing the six-hooked embryo (oncosphere), enlarged. (After Leuckart.)

"die sometimes at  $44^{\circ}$  C., now and then at  $45^{\circ}$  C., and always at  $46^{\circ}$  C." He "therefore concluded that they could in no case survive  $47^{\circ}$  C. and  $48^{\circ}$  C. [ $=116.6^{\circ}$  to  $118.4^{\circ}$  F.] when they are maintained at this temperature for at least five minutes. Lewis found a somewhat higher temperature necessary in order to kill the worms. He states—

(1) That exposure to a temperature of  $120^{\circ}$  F. for five minutes will not destroy life in cysticerci, but they may continue to manifest indications of life for at least two or three days after such exposure; (2) that exposure to a temperature of  $125^{\circ}$  F. for five minutes does not kill them, but (3) after being subjected to a temperature of  $130^{\circ}$  F. for five minutes they may be considered to have perished. After exposure to this and higher temperatures, in no instance have I been able to satisfy myself that the slightest movements took place in their substance when examined even under a high power. At least, it may be confidently asserted that after exposure for five minutes to a temperature of  $135^{\circ}$  to  $140^{\circ}$  F. life in these parasites may be considered extinct.

Pillizzari found that cysticerci died at a temperature of  $60^{\circ}$  C. ( $=140^{\circ}$  F.), while according to Hertwig  $52^{\circ}$  C. ( $=125.6^{\circ}$  F.) reduces the bladder worm to a smeary, soft condition, so that it can be easily flattened out between two pieces of glass. It is important to recall, however, that in cooking large pieces of meat the temperature of the inner portion does not rise as rapidly as that of the outer portion. As an index to the duration of cooking required in order to guaranty that all the bladder worms are killed, Ostertag gives the rule of two hours' cooking for pieces of varying length, but not over 12 cm. ( $=6$  inches) thick. Probably the best criterion in forming a judgment is the color of the meat;  $60^{\circ}$  to  $70^{\circ}$  C. ( $=140^{\circ}$  to  $158^{\circ}$  F.) causes a reduction of the haemoglobin, and this results in giving a gray color to beef and a white color to pork; when slices of cooked beef (or pork) assume this gray (or white) color, it can safely be assumed that all the cysticerci have been killed.

In 1894 and 1895 Berlin, Prussia, cooked 342 insured beef-measly carcasses, representing insurance policies to the value of 57,223.30 marks (about \$13,619.15). During the same period there were condemned 221 uninsured beef-measly carcasses, valued, on the same basis, at 36,977.60 marks (about \$8,800.67). The raw beef was sold to the parties having the cooking in charge at 20 pfennige (about 5 cents) per pound, and after being cooked was sold to the public at 30 to 35 pfennige (about  $7\frac{1}{2}$  to  $8\frac{3}{4}$  cents) per pound. Cooked measly pork was sold at 40 pfennige (about 10 cents) per pound.

*Salting.*—Salt solution kills the bladder worms in twenty-four hours, the parasites becoming shriveled. Here, again, it must be remembered that it takes some time for the salt to reach the deeper layers.

It is probable that this method will to some extent supersede the cooking, since the shrinkage by salting is estimated at only 6.6 per cent. Two carcasses of 500 pounds each, treated at Kiel by different methods, form an excellent comparison. The cooked carcass gave 300 pounds of beef which sold at 30 pfennige (about  $7\frac{1}{2}$  cents per pound; in

all, 90 marks (about \$21.42); the salted carcass gave 460 pounds of beef which sold at 40 pfennige (about 10 cents) per pound; in all, 184 marks (about \$43.79).

In Saxony measly beef has sold as high as 1 mark (about 24 cents) per pound, while in some parts of Germany it has been sold from 2½ to 10 cents per pound. In a few instances the prejudice against this meat was so great that it could not be sold at all. In general, however, the salted measly beef is easier to dispose of than the cooked measly beef.

Ostertag gives as rule for salting the following: Cut the meat into strips of any given length, but not over 6 cm. (3 inches) in thickness, and place for two weeks in a brine composed of 1,000 parts of water, 250 parts of salt, 20 parts of sugar, and 2½ parts of saltpeter. As a practical test to determine whether the salting is thorough, and the parasites are dead, he suggests the use of a 1 per cent solution of nitrate of silver. If applied to the surface of lightly cured meat this solution will produce no change in the appearance; if the meat is fully cured, a momentary milky opacity will result, owing to the formation of chloride of silver. To use the test, wash the meat thoroughly in water, then wipe it with a cloth, and make a quick incision through the middle of the piece to be tested; apply a few drops of the nitrate of silver to the cut surface.

*Cold storage.*—Perroncito maintains that *Cysticercus bovis* dies fourteen days after its host has been slaughtered. More recent investigations by Ostertag, Zschokke, Glage, and others have shown that two weeks form too short a limit, but that none of the worms can survive three weeks; beef-measly meat which has been in cold storage for three weeks may therefore be looked upon as harmless.

In view of these recent investigations, I can see no reason why light cases of beef measles (but not pork measles, see p. 94), which have remained three weeks in cold storage, should not be passed as first-class meat and allowed on the open market without further restrictions. During certain seasons of the year, however, there is a practical objection to this method of safeguarding which has been thus far overlooked (except by Friis). Experience has shown that meat which has been in cold storage for this length of time during summer will spoil much more rapidly when taken out of the cooler than meat which has been placed in the ice box only long enough to cool and "firm."

#### THE ADULT TAPEWORM IN MAN AND METHODS OF PREVENTING THE INFECTION OF CATTLE.

*Taenia saginata*, or the large Unarmed Tapeworm, is the most common of the ten species of tapeworms found in the intestine of man. A form with which it has frequently been confounded is a tapeworm (*T. solium*) of about half the size (2 to 3.5 m.), acquired by eating pork infected with larvae (*Cysticercus cellulosae*), which are very similar to those found in the cattle, but are somewhat larger and possess a double crown of hooks on the head.



The Unarmed Tapeworm of man is almost cosmopolitan, and is especially common in Africa and Asia. Many of the published statistics of the relative frequency of *T. saginata* and *T. solium* are, however, to be taken with reserve. In some countries the Beef-measle Tapeworm is said to be increasing and the Pork-measle worm to be decreasing in frequency; but in some cases these statements are unquestionably based upon misdeterminations. Physicians too frequently make their determinations upon the external form of the segments—a method which can not be relied upon, even when such determination is made by a specialist. In America, for instance, it is frequently stated that *T. solium* is more common than *T. saginata*, but this view has been shown to be erroneous (Stiles, 1895, p. 281). According to the official medical statistics of the late civil war, 566 cases of tapeworms were noticed in 5,548,854 patients from July 1, 1862, to June 30, 1866, or 1 : 9,803, but no indication as to the species found is given. In some countries statistics seem to show that tapeworm disease has been on the increase. Thus Bérenger-Féraud (1892) records the following statistics for the maritime hospitals of France :

Year.	Cases.	Patients.	Cases per 1,000 patients.
1861-65 .....	33	130,927	0.20
1866-70 .....	95	152,822	0.62
1871-75 .....	422	137,361	3.06
1876-80 .....	1,108	130,898	8.45
1881-85 .....	1,565	155,646	10.05
1886-90 .....	2,253	152,352	14.80

Bérenger-Féraud looks upon 1860 as the date of introduction of *T. saginata* into France, but Blanchard has shown that this is not the case, although he admits that it has increased in frequency from year to year

Krabbe has published the following valuable statistics regarding tapeworms of man in Denmark :

Year.	<i>T. saginata.</i>	<i>T. solium.</i>	<i>Dipylidium caninum.</i>	<i>Bothriocephalus latus.</i>
Before 1869 .....	37	53	1	9
1869-80 .....	67	19	4	11
1880-87 .....	87	5	4	5
1887-95 .....	89	.....	6	30

It seems quite well established that there has been an increase in the frequency of *T. saginata* in man in some districts, but since Hertwig's important observation in 1889-90 regarding the seats of predilection of the larval stage the destruction of so many more larvae must necessarily have resulted in decreasing the frequency of this species in man. There can be no question that since the trichina scare in 1860 and the following years, which led to an inspection of pork in some countries, and to greater care in cooking it in others, *T. solium* has decreased in frequency.

The following key will aid in the determination of the tapeworms of man :

#### KEY TO THE ADULT TAPEWORMS OF MAN.

[For forms recorded in this country follow Roman type.]

- (1) Head with two elongate grooves or slit-like suckers; rostellum absent; uterus with special pore; genital pores generally dorsal or ventral.

*Bothriocephalidae*, 2.

Head with four cup-shaped suckers; rostellum present but not always evident; uterus without special pore; genital pores generally marginal... *Taeniidae*, 4.

BOTHRIOCEPHALIDAE (Subfamily *Bothriocephalinae*).

- (2) Body with external segmentation; head with two elongate or groove-like suckers: Genital organs single in each segment; cirrus, vulva, and uterus open ventro-median..... *Bothriocephalus*, 3.  
*Genital organs double in each segment; cirrus, vulva, and uterus open ventrally; worm very large, attains about 10 meters in length by 2 cm. in breadth; life history unknown. Found in Japan*..... *Krabbea grandis*.

BOTHRIOCEPHALUS.

- (3) Very large, attains 10 meters or more in length, reddish gray in color; very rare in this country; obtained from eating fish: Common pike (*Lucius lucius*), ling (*Lota lota*), perch (*Perca fluviatilis*); several members of the salmon family (*Salmo umbla*, *S. trutta*, *S. lacustris*, *Thymallus vulgaris*, *Coregonus lavaretus*, *C. albula*, *Onchorrhynchus Perryi*, and perhaps *Salmo salar*)..... *B. latus*.  
*(B. latus includes B. cristatus Davaine, 1874.)*  
*Length a little less than four feet; found in Greenland*..... *B. cordatus*.  
*(A larval Bothriocephalus (B. Mansoni) is found in subperitoneal connective tissue of man.)*

TAENIIDAE.

- (4) Egg with thin outer shell and thick brown inner shell (embryophore); uterus median and longitudinal with lateral branches; head generally armed; larval stage a Cysticereus, Coenurus or an Echinococcus generally in herbivora; adults in carnivorous or omnivorous animals..... *Taeniinae*, 5.  
 Egg with thin transparent shells, and frequently in egg capsules; in some cases scattered through the segment; head nearly always armed with hooklets on rostellum; larval stage a cysticereoid; adults in birds and mammals.  
*Dipylidiinae*, 7.

TAENIINAE.

- (5) Head with armed rostellum..... 6.  
 Head unarmed, rostellum absent; strobila attains 3 to 10 meters in length; ovary of pore side undivided; uterus with 17 to 30 branches on each side; the most common tapeworm of man in this country; larva in cattle.  
*Taenia saginata*, p. 71.  
 (6) Rostellum with two rows of hooks, 24 to 32 in number; strobila attains 4 to 8 meters in length; ovary of pore side divided; uterus with 7 to 12 branches each side; comparatively rare in this country; larva in swine.  
*T. solium*, p. 89.  
 Rostellum (?)<sup>1</sup>; strobila attains 5 meters in length; terminal proglottids 27 to 35 mm. long by 3.5 to 5 mm. wide ..... *T. confusa*.  
 (The larval stages of *T. solium* and *T. echinococcus* are also found in man.)

<sup>1</sup>Ward describes the rostellum as having 6 or 7 rows of very small hooks. Through the kindness of Professor Ward, I have recently examined the head and a number of segments of the original material. This examination leads me to look upon the head as a head of *Dipylidium caninum*, which has accidentally been placed in the wrong bottle, a possibility which had also occurred to Ward. Regarding the remarkable segments, I do not wish to commit myself until I have opportunity to study a complete specimen.

## DIPYLIDIINAE.

- (7) Suckers unarmed..... 8.  
*Suckers armed (the suckers of the young specimens will undoubtedly be found to be armed, although the specimens thus far found in man were unarmed, the hooks probably having fallen), the hooks being arranged in circular rows on border; hooks on rostellum resemble a hammer in form, about 90 in number and arranged in a double row, or rostellum rudimentary and unarmed; strobila 25 to 30 cm. long. Very rare; not yet recorded for America. Larva probably in some invertebrate.*  
*Dacainia madagascariensis.*
- (8) Genital pores double; two submedian ovaries in each segment; several rows of hooks on rostellum; strobila attains 15 to 35 cm. in length; gravid segments elliptical. Adults found in dogs and cats; rare in man. Larva found in lice and fleas of dogs (*Trichodectes canis* and *Pulex serraticeps*)... *Dipylidium caninum*.  
 Genital pores single and unilateral (on left of segment); rostellum with 24 to 30 hooks, the dorsal root longer than prong or ventral root; three testicles normally present in each segment; eggs with three envelopes.... *Hymenolepis*, 9.
- (9) Hooks (24 to 28 in number, 15  $\mu$  long) present on rostellum; body 10 to 15 mm. long; not uncommon in Italy; found also in other parts of Europe. Found in rodents (rats, etc.), as well as man; larva develops in the villi of the intestine..... *H. murina*.  
 (Including *Taenia nana*.)  
 Rostellum rudimentary and unarmed; 20 to 40 cm. or more long; adult generally parasitic in rodents (rats); larval stage develops in certain insects (*Asopia farinalis*, *Anisobatis annulipes*, *Akis spinosa*, *Scaurus striatus*)..... *H. diminuta*.  
 (Including *Taenia flavopunctata*.)

If a person is known to have a tapeworm, it is of great importance, both from an economic (agricultural) and a hygienic standpoint, to know whether one of these two tapeworms (*T. saginata*, the Beef-measle Tapeworm, and *T. solium*, the Pork-measle Tapeworm) is present, and if so, which one. This can be determined in several ways:

(1) Since the Pork-measle Tapeworm comes from pork, it will not be found in persons who abstain from eating that meat, as is usually the case among Hebrews. So that if one of these two parasites were found in such persons it could be only the Unarmed Tapeworm.

(2) On the other hand, those who eat pork but no beef would not be infested with the Unarmed Tapeworm, but we would expect to find in them the Pork-measle (armed) Tapeworm.

These two modes of diagnosis do not hold in all cases, for, as already stated, man is subject to ten different species of tapeworms. Most of the remaining eight species are, however, so totally different from the two under consideration that a positive diagnosis can be made by comparing the worms with figs. 73 and 81, and with the key given above.

(3) When segments of the parasite break off and wander out of their own accord or with stools of the person affected, it should be noticed whether several segments are joined together or whether every portion consists of a single segment. In the former case, the parasite is generally the armed parasite, in the latter case generally the unarmed parasite.

(4) Take a segment of the parasite found in the stool or bed, press it between two pieces of glass and hold it up to the light. Comparing



it with figs. 73 and 81, notice whether the uterus has 17 to 30 branches on each side of the main trunk (Unarmed Tapeworm) or from 7 to 10 branches each side (Armed Tapeworm).

(5) In case the head is found, notice whether hooks are absent (unarmed) or whether two rows of hooks are present (armed).

The necessity of knowing which parasite is present is, first, that the Armed Tapeworm injures man, not only because it inhabits his intestine, but also because the larval stage may develop in the muscles, eye, and other portions of the body, and a man who has the Armed Tapeworm stands in constant danger of infecting himself with these larvae. The Unarmed Tapeworm, on the other hand, develops only in the intestine, its larval form being unable to develop in man.

In the second place, it is important to know which tapeworm is present in a person, especially in a farm hand, for if he has the unarmed form there is constant danger of his infecting the cattle by passing his excrements in fields where cattle feed; if he carries the Armed Tapeworm he will infect the hogs, should he void his excrements in a place to which swine have access.

*Symptoms.*—The symptoms exhibited by a patient troubled with tapeworms are both general and local: Itching at the extremities of the intestinal canal, and various dyspeptic symptoms; uncomfortable sensations in the abdomen,<sup>1</sup> uneasiness, fullness or emptiness, sensation of movement attributed to the movements of the parasite, colicky pains; disordered appetite, at times deficient, at other times craving; paleness and discoloration around the eyes; fetid breath; sometimes emaciation; dull headache; buzzing in the ears; twitching of the face; dizziness; often the uncomfortable feelings in the intestine are increased by fasting and relieved after a hearty meal; fainting, chorea, epileptic fits.

*Diagnosis.*—A positive diagnosis can be made by finding the segments of tapeworms in the stools, bed, or clothes of the patient, or by a microscopic examination of the faeces in search of eggs.

*Treatment.*—It is always advisable to consult a physician in regard to treatment, especially when the patient is much run down in health or naturally delicate in constitution, since “in weak persons, such as those having consumption, the treatment, if admissible at all, must be conducted with the greatest care, lest the patient’s strength be exhausted” (Pepper). It is not always possible, however, for men on the ranches to obtain the services of a physician, so the following hints are given in regard to treatment and may be followed without danger by a strong and healthy person of ordinary intelligence:

Before taking any of the medicines suggested below, it is necessary to prepare for the treatment by removing all obstructions in the intestine to the free exit of the parasite. This can best be done by living

<sup>1</sup>The most constant symptom which I observed in an experimental infection of myself with *T. saginata* was the sensation which one experiences in the rapid descent of an elevator. This peculiar feeling frequently occurred, especially when walking

for two or three days on a light diet of milk, coffee, soup, and bread; but vegetables should not be taken. On the evening before taking the medicine it is also advisable to give the patient a thorough injection of 1 to 2 quarts of warm water, to which 1 to 2 tablespoonfuls of pure glycerin may be added.

Early the next morning one of the following doses may be taken:

(1) Take 1 to 2 ounces of oil of turpentine + 1 ounce of castor oil, mixed with the white of an egg and some sugar. Take the whole dose at one time, and if a movement of the bowels does not follow within two or three hours, take another dose of castor oil (1 ounce) (Leidy, 1885).

Objection has been raised by some practitioners to the use of oil of turpentine on the ground that it causes an intense burning sensation in the intestine and produces headaches which may last several days.

(2) The most generally useful remedy is the oleo-resin of male fern,<sup>1</sup> which is in reality an ethereal extract of the drug. A half drachm or drachm of the remedy is given in the morning after two days' restriction of diet, and in the evening a brisk cathartic, such as castor oil, should be administered. Sometimes calomel is given in combination with the oleo-resin. The patient should remain abed after the administration of the remedy, to avoid syncope and other effects of large doses of the drug (Pepper, 1894). In overdose, this medicine is a distinct poison; six drachms have caused death.

(3) One or two ounces of pumpkin seeds ground and made into a paste with sugar. Follow in an hour with a dose of castor oil. This is one of the best, cheapest, and safest tapeworm remedies.

(4) Tanret's Pelletierine is very highly recommended but is rather expensive (\$2.50 per dose) and often difficult to procure fresh in this country. In case this is taken the instructions which come with the bottle (one dose) must be strictly carried out.

Many other remedies could be suggested, but those given above are among the most simple and will suffice for this report.

Whatever anthelmintic is used, the medicine should be procured as fresh as possible. Many failures in treating for parasites are due to the fact that the remedy used has lost its anthelmintic property.

When the parasite is being passed the patient should evacuate into a vessel containing warm water, the object of this being to prevent the worm from breaking or attempting to retain its hold in the intestine in case it is still alive, as it will frequently do if it comes in contact with any cold object. The patient should likewise avoid pulling the worm while it is being expelled, for he is thus liable to break it.

When the movement is completed the stool should be examined thoroughly for the head, for if this has remained in the intestine it will give rise to new segments again, and in about three or four months the patient will discover that he is still infected. If the head is not found upon examination of the stool, it is best not to repeat the treatment until the segments have again appeared, for, as the head is quite small, it may have escaped notice, although present in the stool, and in that case the second treatment would be useless.

*Prevention.*—After what has been said, it is exceedingly easy to see

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<sup>1</sup> Male fern and kamala capsules are put up ready for use. Directions come with each box.

the measures which should be adopted to prevent this disease: (1) Persons should not eat meat in which fresh cysticerci are present; (2) meat in which only a few cysts have been found, but have been cut out, should be thoroughly cooked or salted before eating, or, (3) such beef should lie in cold storage for three weeks at least; (4) cattle and hogs should not have access to human excrements, especially when it is known that persons in the neighborhood have tapeworms; (5) persons should not void their excrements on fields where live stock is feeding.

By following out these simple instructions it will not be a difficult task to totally eradicate the tapeworm disease caused by *T. saginata* and *T. solium* in man, and the corresponding disease of "measles" caused by the larvae of these worms in cattle and hogs. In fact, it has been noticed in several parts of Europe, where meat is inspected, that certain tapeworms are gradually becoming rarer, owing to the condemnation of meat containing the cysts.

**20. Pork Measles (*Cysticercus cellulosae*) of Man and Swine, and its adult stage, The Armed, or Pork Measle, Tapeworm (*Taenia solium*) of Man.**

[Figs. 75-83.]

Many authors state that the Pork-measle Tapeworm is the common tapeworm of man for the United States, but a careful study of the subject has shown this view to be erroneous.

**LARVA (*Cysticercus cellulosae*).**

For anatomical characters, compare figs. 75 and 76 with key, p. 21.

SYNONYMY.—*Finna* Werner, 1786; *Taenia hydatigera* Fischer, 1788; *T. cellulosae* Gmelin, 1790; *T. finna* Gmelin, 1790; *Vesicaria hygroma humana* Schrank, (?-); *V. finna suilla* Schrank, (?-); *V. lobata suilla* Fabricius, (?-); *Hydatis finna* (Werner) Blumenbach, (?-); *H. humana* Blumenbach, (?-); *Taenia muscularis* Jördens, 1802; *T. hydatigena anomala* Steinbuch, (1802); *Cysticercus finna* (Gmelin) Zeder, 1803; *C. cellulosae* (Gmelin) Rudolphi, 1808; *C. finnus* (Gmelin) Laennec, 1812; *C. solium* Koeberlé, 1861; *C. suis* Cobbold, 1869; *Neotaenia* Sodero, (1886); *C. cellulosus* of several authors; "*Cysticercus*" *cellulosae* of Schneidemühl, 1896.

ANOMALIES.—The names proposed by various authors for these supposed distinct species found in man, especially in the cranial cavity, are more or less descriptive. *Hydatis piriformis* Fischer, 1789 (= *Taenia pyriiformis* (Fischer) Treutler, 1793 = *Cysticercus pyriiformis* (Treutler) Zeder, 1803 = *C. Fischerianus* Laennec, 1812); *Taenia albopunctata* Treutler, 1793 (= *C. albopunctatus* (Treutler) Zeder, 1803 = "*T. albopunctata hominis* Treutler" of Cobbold, 1864); *Cysticercus dicystus* Laennec, 1812; *C. acanthotrias* Weinland, 1858; *C. turbidatus* Koeberlé, 1861; *C. melanocephalus* Koeberlé, 1861; *C. racemosus* Heller, 1875 (= *C. bothryoides* Heller, 1875 [nec Reinitz, 1885] = *C. multilocularis* Küchenmeister, (?-); *Trachelocampylus* Davaine, 1880 (for *Trachelocampules* Fredault, 1847).

HOSTS.—Man, swine, wild boar, and other animals. (See pp. 137-143.)

**ADULT (*Taenia solium* Linnaeus, 1758).**

For anatomical characters, compare figs. 77-81 with key, p. 84.

SYNONYMY.—*Taenia solium* Linnaeus, 1758 (after elimination of *T. saginata* and *T. marginata*); *T. cucurbitina* Pallas, 1766 (= *T. solium* Linnaeus, renamed); *T. cucurbitina* Art [=var.] *pellucida* Goeze, 1782; *T. cucurbitina, plana, pellucida* Goeze,



1782; *T. solitaria* Leske, (1785), pro parte; *Halysis solium* (Linnaeus) Zeder, 1803; *Taenia humana armata* Rudolphi, 1810, pro parte (= Brera's, 1802, *Tenia armata umana*); *T. solium* Linnaeus of Küchenmeister, 1852; *T. hamoloculata* Küchenmeister, 1855 (possibly earlier); *T. turbinata* Koeberlé, 1861; *T. (Cystotaenia) solium* of Leuckart, 1863; *T. tenella* Cobbold, 1874 [nec Pallas, 1781]; (?) *T. solium* var. *minor* Guzzardi Asmendo, 1876; *T. officinalis* Bos, 1894.

ANOMALIES.—(?) "*Taenia vulgaris*" Werner, 1782 [nec Linnaeus, 1758] = *T. dentata* Batsch, 1786; (?) *T. fenestrata* Chiaje, 1833; *T. (Cysticercus) acanthotrias* of Leuckart, 1863; (?) *T. fenestrata* Colin, 1885; *T. solium fenestrata* Colin, 1876; (?) *T. fusa*, *T. continua*, *T. solium fusa* seu *continua* Colin, 1876; (?) *T. scalariforme* Notta, 1885 (= *T. fenestrata* Colin, renamed) = *T. solium scalariforme* Notta, 1885.

PRE-LINNAEAN NAME.—(?) *Taenia degener* Spigelius, 1618.

BIBLIOGRAPHY.—For bibliography, see Huber, 1892. For technical discussion, see Leuckart (1880, pp. 617-713); R. Blanchard (1886, pp. 382-418).

HOST.—Man. It is an error for the Minnesota State board and the North Carolina Station to record it in dogs.

**Life history.**—The life cycle of the Pork Bladder Worm is exactly the same as that of the Beef Bladder Worm (see p. 72), except that the hog is the intermediate host. The following observations regarding the larval parasite at different ages have been made by various authors:

*Nine days after infection.*—An oval vesicle 33  $\mu$  long by 24  $\mu$  broad; connective tissue cyst absent. (Mosler.)

*Twenty days after infection.*—Parasite consists of a delicate, transparent bladder worm about as large as the head of a pin. The anlage (primordium) of the head is represented by a small, indistinct point; surrounding cyst absent. (Gerlach.)

*Twenty-one days after infection.*—Spherical, 0.8 mm. in diameter; slightly attenuate toward the point, showing the anlage (primordium) of the head. (Leuckart.)

*Thirty-two days after infection.*—Ellipsoid, 1 mm. to 6 mm. long by 0.7 mm. to 2.5 mm. broad. The largest specimens show the excretory system; the anlage (primordium) of the head equatorial; connective tissue cyst very thin.

*Forty days after infection.*—Surrounding cyst still very delicate; about as large as a mustard seed, or somewhat larger; head very evident, suckers and hooks visible, but not complete. (Gerlach.)

*Sixty days after infection.*—Size of a pea or slightly larger. When freed from the connective tissue, cyst somewhat renal in form; head as a small, white knob, but without neck; hooks and suckers fully developed. (Gerlach.)



FIG. 75.—A piece of pork heavily infested with pork measles (*Cysticercus cellulosae*), natural size (original).

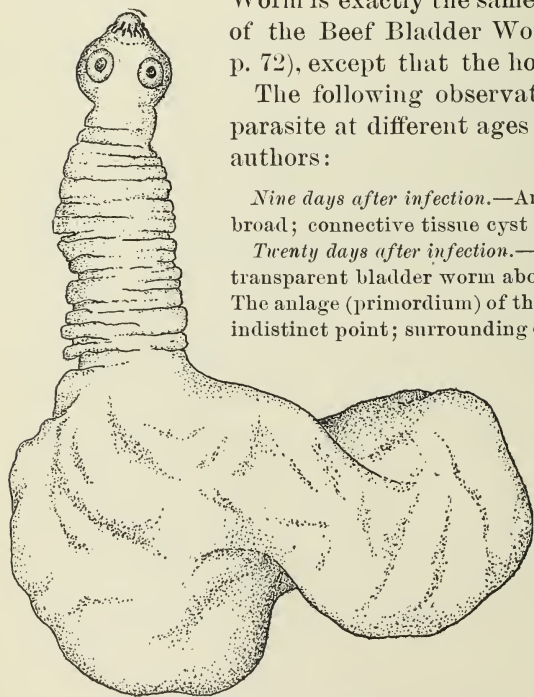


FIG. 76.—An isolated Pork-measle Bladder Worm (*Cysticercus cellulosae*), with extended head, greatly enlarged (original).

*One hundred and ten days after infection.*—Neck developed; transverse lines slightly visible; head is invaginated in the bladder. (Gerlach.)

The determination of the age of the parasite is of importance in case that there is a guaranty of freedom from infection. According to Rasmussen the periods of guaranty are: In Prussia, Bavaria, and Austria, 8 days; in certain other parts of Europe, 9, 15, and 21 days; in Baden and Württemberg, 28 days, and in Saxony, 30 days.

It is generally estimated that three to four months are required for the parasite to complete its development, but as the hooks and suckers are formed after two and a half months it is not impossible that a parasite ten to eleven weeks old would develop into the adult tapeworm if eaten by man; although, according to Gerlach, pork measles less than two months old are not dangerous. The longevity of the bladder worm varies with circumstances, but the factors here concerned are not understood. According to Railliet, cases have been observed in man where the bladder worm has caused severe cerebral troubles for twelve to fifteen years, and it has been observed in the eye for twenty years. The worms may undergo calcareous degeneration very early, but as a rule this does not take place until the cyst is quite old.

The degeneration begins with the capsule and ends with the scolex, and, according to Morot, may be divided into four stages, as follows:

*First stage.*—The capsule shows cheesy, opaque spots, but the fluid is clear, and the scolex is intact.

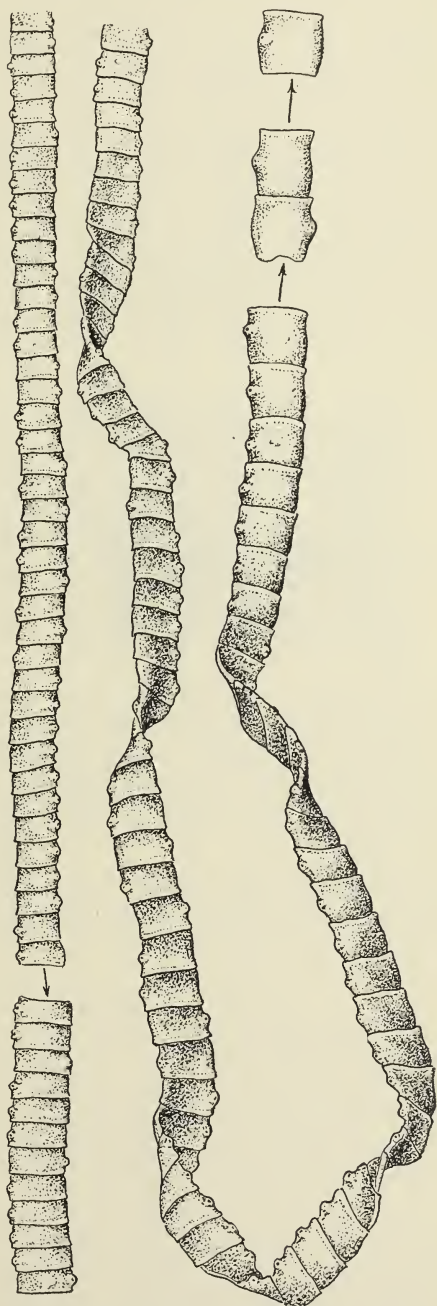


FIG. 77.—Several portions of an adult Pork-measle Tape worm (*Taenia solium*), natural size (original).

*Second stage.*—Both the connective tissue capsule and the bladder cyst become cheesy; hooks are present, but the suckers more or less degenerated.

*Third stage.*—Hooks are present, but not in definite order or number.

*Fourth stage.*—No traces of the hooks can be found in the parasite, which is reduced to a cheesy mass.

Ostertag states that degeneration may take place before the hooks have formed. Ostertag has also shown that the hooks become loose, upon expression of the scolex, only in dead bladder worms.

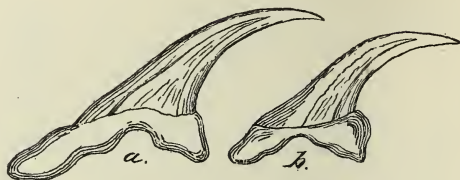


FIG. 78.—Large (a) and small (b) hooks of Pork-measle Tapeworm (*Taenia solium*).  $\times 280$ . (After Leuckart, 1880, p. 661, fig. 293.)

### PORK MEASLES.

*The disease in hogs.*—The symptoms in hogs are very indefinite, but a diagnosis may sometimes be made by examining the visible mucous membranes of the mouth, particularly under the tongue. See also the same subject for cattle, p. 77.

A heavy infection of measles is more common in hogs than in cattle—a fact easily understood when we recall the feeding habits of the two animals, the comparative size of their bodies, and of their stomachs.

From 1884 to 1887, of 5,610 measly hogs found at the Berlin (Prussia) abattoir, 2,167 were heavily infested, 1,641 had medium infections, and 1,802 were slightly infested.

*Treatment.*—See page 77.

### ABATTOIR INSPECTION.

See discussion, page 77. As the Armed Tapeworm is more dangerous to man than the unarmed form, the abattoir inspection for *Cysticercus cellulosae* is more important from a hygienic standpoint than the inspection for *C. bovis*.

*Position of the parasites in hogs.*—The Pork-measle Bladder Worm is found in the muscles, especially in the abdominal muscles, the muscular portion of the diaphragm, the psoas, tongue, heart, the muscles of mastication, intercostals, muscles of the neck, the adductor of the hind legs, and the pectorals. These parts are shown by fig. 83. Particular stress should be laid

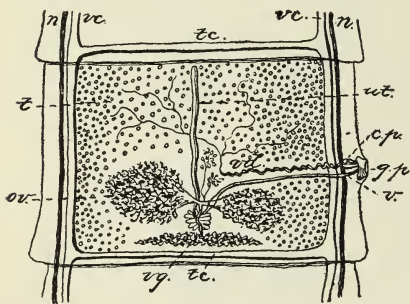


FIG. 79.—Mature sexual segments of Pork-measle Tapeworm (*Taenia solium*), showing the divided ovary on the pore side; cp, cirrus pouch; gp, genital pore; n, nerve; ov, ovary; t, testicles; tc, transverse canal; ut, uterus; v, vagina; vc, ventral canal; vd, vas deferens; vg, vitelline gland.  $\times 10$ . (After Leuckart, 1880, p. 665, fig. 294.)

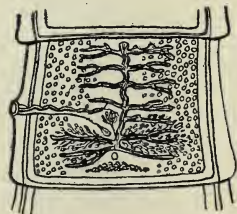


FIG. 80.—Segment of Pork-measle Tapeworm (*Taenia solium*) in which the uterus is about half developed.  $\times 2$ . (After Leuckart, 1880, p. 666, fig. 295.)



upon an examination of the tongue and muscles of mastication, the muscles of the shoulder, neck, and diaphragm.

The parasite of hogs which is most liable to be mistaken for *C. cellulosa* is the large bladder worm with a long neck (*C. tenuicollis*, p. 96). The latter form, which is not transmissible to man, occurs under the serous membranes of the body cavities, but is not found in the muscles; it is much larger, and is provided with more hooks (28 to 40) than *C. cellulosa* (22 to 28).

*Frequency of Cysticercus cellulosa in hogs.*—Satisfactory statistics regarding the presence of this parasite in American hogs are lacking; we know, however, the American hogs are comparatively free from this worm. The statistics for Prussia are quite complete, the proportion of infested hogs being as follows:

1876 to 1882.—One hog infested in every 305 hogs examined. (Johne, after Ostertag.)

1886 to 1893.—One hog infested in every 637.5 hogs examined.<sup>1</sup>

The proportion of measly hogs appears to vary in different localities. Thus at the Berlin abattoir the average for seven years was 1 infested hog to every 173 hogs examined (Ostertag). In south Germany the parasite is said to be rare. It is much more common in the eastern Prussian provinces than in the western, as shown by Ostertag in the following statistics for 1892:

Regierungsbezirk.	Proportion.	Regierungsbezirk.	Proportion.
Marienwerder.....	1:28	Arnsberg.....	1:865
Oppeln.....	1:80	Coblenz.....	1:975
Königsberg.....	1:108	Düsseldorf.....	1:1070
Stalsund.....	1:187	Münster.....	1:1900
Posen.....		Wiesbaden.....	
Danzig.....	1:250	Entire Prussia.....	1:1290
Frankfurt.....		Eastern provinces.....	1:604
Bromberg.....			

The hogs imported into Germany from Russian Poland, Galicia, Bohemia, and Siberia were infested in much higher proportion than the German hogs; in some of the importations the proportion ran as high as 50 per cent (Ostertag).

<sup>1</sup> The totals of the following table do not agree with the totals published in Germany, but are made upon the details given for the various years. Several errors in addition were noticed in the German statistics.

Year.	Hogs inspected.	Hogs infested with <i>C. cellulosa</i> .	Authority.
1886.....	4,834,898½	10,126	Veröff. d. kais. Gesundheitsamtes, 1891, p. 244.
1887.....	5,486,416½	11,068	
1888.....	6,051,249½	10,031	
1889.....	5,500,678½	8,373	Veröff. d. kais. Gesundheitsamtes, 1894, p. 208.
1890.....	5,590,512	5,492	
1891.....	6,550,182	7,689	
1892.....	6,134,559	9,364	Veröff. d. kais. Gesundheitsamtes, 1895, p. 347.
1893.....	6,251,776	10,640	
Total.....	46,400,272	72,783	

*Influence of the age of the host.*—According to Gerlach hogs over six months old will not become infested with this parasite, but this is not admitted by Fischöder.

*Disposition of measly pork.*—See disposition of measly beef, p. 81. Since *Taenia solium* is more dangerous than *T. saginata*, the regulations concerning the disposition of measly pork should be even more rigid

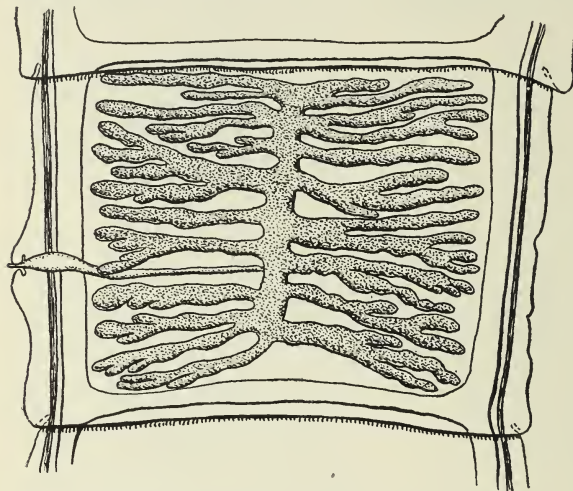


FIG. 81.—Gravid segment of Pork-measle Tapeworm (*Taenia solium*), showing the lateral branches of the uterus, enlarged (original).

pork is watery and pale; it decomposes easily, and has a disagreeably sweet taste. Such cases should, of course, be condemned to the tank.

*Cooking.*—According to Perroncito, *C. cellulosae* dies at  $45^{\circ}$  to  $50^{\circ}$  C. ( $=113^{\circ}$  to  $122^{\circ}$  F.). (See also p. 81.) It dies in 1 minute at  $50^{\circ}$  C.

*Storage.*—Living specimens of *C. cellulosae* have been found in pork twenty-nine days after slaughtering (Railiet). After fourteen to nineteen days of cold storage at  $-10^{\circ}$  to  $-15^{\circ}$  C. the parasites are said to be dead; the protoplasm has become viscid, bluish opaque, and the hooks have fallen. More observations are needed upon this subject.

*Effects of electricity.*—Glage has experimented some with electricity in order to kill the parasite of pork measles, but further study in this line is desirable before the method is adopted.



FIG. 82.—Eggs of Pork-measle Tapeworm (*Taenia solium*): a, with primitive vitelline membrane; b, without primitive vitelline membrane, but with striated embryo.  $\times 450$ . (After Leuckart, 1880, p. 667, fig. 297.)

#### THE ADULT AND LARVAL TAPEWORM IN MAN.

See discussion, page 83. It should always be recalled that the Armed Tapeworm is more dangerous than the Unarmed Tapeworm, since, as already stated, the larva as well as the adult may develop in man.

<sup>1</sup> During the year 1889-90 Berlin, Prussia, found 373 cases of alleged single infection; of these, 56 cases were afterward shown to contain more than one parasite.

*Treatment.*—See page 87.

*Cysticercus cellulosae in man.*—This infection may take place in different ways; a patient may either soil his hands with the microscopic eggs during defaecation and afterward swallow the eggs; or, through a reverse peristaltic movement of the intestine, gravid segments may be carried into the stomach, where the shells will be destroyed, thus freeing the embryos. An infection through a contaminated water supply may also take place. (See Life history, p. 90.) In man the bladder worm may develop in the muscles, the eye, and the brain.

The following statistics upon the distribution of the worm in various parts of the body have been compiled from different sources:

Locality.	Parasite found in—						Total number of cases.	Authority.
	Brain.	Muscles.	Heart.	Lungs.	Under skin.	Liver.		
Dresden .....	21	11	3	.....	.....	.....	22	Müller.
Erlangen .....	72	1	.....	.....	.....	.....	14	
Berlin .....	13	13	6	3	3	2	87	Dressel.
Erlangen .....	6	6	.....	.....	2	.....	21	Haug (1874-1885).
(?) .....	.....	1	.....	.....	.....	.....	6	Gribbohm.
(?) .....	5	.....	.....	.....	.....	.....	5	Sievers.
Total ....	117	32	9	3	5	2	155	

The following statistics refer to the presence of this parasite in the eye:

Locality.	Total number of patients or bodies.	<i>C. cellulosae</i> in the eye.	Authority.
Berlin .....	80,000	80	von Gräfe.
Berlin .....	60,000	70	Hirschberg (1869-1885).
Berlin .....	30,000	1	Hirschberg (1886-1889).
Berlin .....	43,000	2	Hirschberg (1890-1894).
France .....	60,000	1	De Wecker
Austria .....	30,000	7	Mauthner } Parasite in crystallin lens.

According to Virchow, the proportion of cysticercus in the human cadavers dissected in Berlin has been reduced from 1:31 (before the introduction of meat inspection) to 1:280 (since the introduction of meat inspection).

The following statistics, collected from various sources by Blanchard, refer to post-mortem examinations:

Locality.	Number of post-mortems.	Number infected.	Proportion infected.
Switzerland:			<i>Per 1,000.</i>
Zürich .....	2,500	1	2.5
Basel .....	1,100	0	.0
Basel .....	1,914	6	1.13
Germany:			
Kiel .....	.....	.....	6
Erlangen .....	.....	.....	6.7
Dresden .....	.....	.....	11.3
Berlin .....	.....	.....	16.4
Berlin .....	.....	.....	12.5

*Prevention.*—See page 88.



**21. The Thin, or Long, Necked Bladder Worm (*Cysticercus tenuicollis*) of Cattle, Sheep, and Swine, and its adult stage, The Marginate Tapeworm (*Taenia marginata*) of Dogs and Wolves.**

[Figs. 84-87A, 88, 89B, 90-93.]

Still another bladder worm, which is by no means uncommon in the animals of this country, occurs in the body cavity of cattle, sheep, swine, and other animals, attached to the diaphragm, omentum, liver, or other organs.

When eaten by dogs or wolves, it develops into the Marginate Tapeworm, which was formerly confused with *T. solium* of man, and gave rise to the erroneous idea that the Pork-measle Tapeworm occurs in dogs as well as in man.

LARVAL STAGE (*Cysticercus tenuicollis*).

For anatomical characters, compare fig. 84 with key, p. 21.

SYNONYMY.—*Taenia hydatidea* Pallas, 1760; *T. hydatigena* Pallas, 1766, pro parte; *Hydra hydatula* Linnaeus, (1766); *Vermis vesicularis eremita* Bloch, 1782; *Hydatigena orbicularis* Goeze, 1782; *H. globosa* Batsch, 1786; *H. oblonga* Batsch, 1786; *Vesicaria orbicularis* Schrank, 1788; *Taenia simiae* Gmelin, 1790; *T. ferarum* Gmelin, 1790; *T. caprina* Gmelin, 1790; *T. ovilla* Gmelin, 1790; *T. vervecina* Gmelin, 1790; *T. bovina* Gmelin, 1790; *T. apri* Gmelin, 1790; *T. globosa* (Batsch) Gmelin, 1790; *Hydatula solitaria* Viborg, (1795); *Cysticercus claratus* Zeder, 1803; *C. simiae* (Gmelin) Zeder, 1803; *C. caprinus* (Gmelin) Zeder, 1803; *C. tenuicollis* Rudolphi, 1810; *C. visceralis simiae* Rudolphi, 1810 (*T. simiae* Gmelin, renamed); *C. lineatus* Laennec, 1812; *C. ovis* Cobbold, 1865; *Monostomum hepaticum suis* Willach, 1893; "*Cysticercus*" *tenuicollis* of Schneidemühl, 1896.

FIG. 83.—Half of hog, showing the portions most likely to become infested with pork measles. (After Ostertag, 1895, p. 387, fig. 79.) See p. 92.

PRE-LINNAEAN NAMES.—*Hydatides* Bartholini, 1673; *Vermes vesiculares* Hartmann (1685), quoted by Pallas as *Hydatis animata*; *Lumbricus hydropicus*, Tyson, 1691.

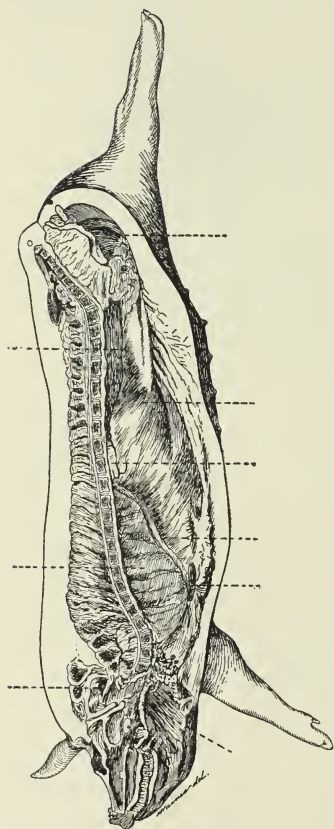
ADULT STAGE (*Taenia marginata* Batsch, 1782).

For anatomical characters, compare figs. 85-89 with key, p. 101.

SYNONYMY.—See also pp. 89-90. *Taenia solium* Linnaeus, 1758, pro parte; *T. cateniformis* Goeze, 1782, pro parte; *T. marginata* Batsch, 1782; *T. lupina* Schrank, (1788); *T. cateniformis*  $\beta$ . *lupi* Gmelin, 1790; *Halysis marginata* (Batsch) Zeder, 1803; also "*T. solium*" of dogs, of several medical authors.

BIBLIOGRAPHY.—For technical discussion, see Deffke, 1891.

HOSTS.—Dog and wolf. (See pp. 137-143.)



*Life history.*—In tracing the life history it is best to begin with the egg, produced by the adult tapeworm in the intestine of dogs. These eggs, containing a six-hooked embryo, escape from the dog with the excrements and are scattered on the ground, either singly or confined in the escaping segments of the tapeworm. Once upon the ground they are easily washed along by rain into the

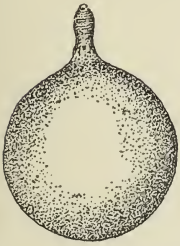


FIG. 84.—The Thin-necked Bladder Worm (*Cysticercus tenuicollis*), with head extruded from body, from cavity of a steer, natural size (original).

drinking water, ponds, or brooks, or scattered on the grass. Upon being swallowed with fodder or water, they arrive in the stomach of the intermediate host (cattle, sheep, etc.), where the eggshells are destroyed and the embryos set free. The embryos then traverse the intestinal wall, and according to most authors arrive either actively, by crawling, or passively, by being carried along by the blood, in the liver or lungs, where they undergo certain transformations in structure. While still in the finer branches of the blood vessels of the liver, which they transform into small irregularly shaped tubes about 12 to 15 mm. long and 1 to 1.5 mm. broad, the embryos lose their six hooks, and develop into small round kernels, which are generally situated at one end of the tubes. The embryo can first be seen about four days after infection. The “scars” (figs. 91 and 92) described in the liver of animals infested with *Cysticercus tenuicollis* are nothing more nor less than these tubes, or altered blood vessels, caused by the growth and wandering of the parasites. In a shoat which Leuckart infected with eggs, and which he killed twenty-three days after the infection, he found two young cysticerci in the liver 6 to 8.5 mm. long and 3.5 to 5 mm. broad. In the smaller parasite no head was visible; in the larger, one end was slightly differentiated and evidently represented the anlage (primordium) of the

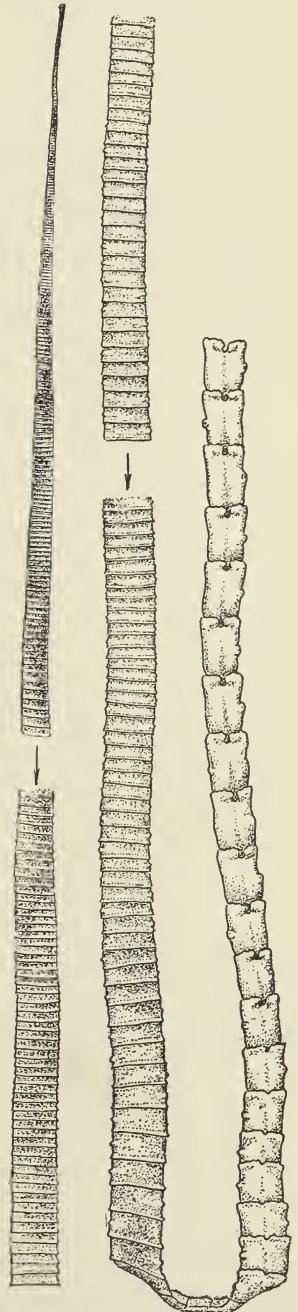


FIG. 85.—The Marginate Tapeworm (*Taenia marginata*), natural size (original).

scolex—that is, the head and neck in course of development. The portion which was destined to give rise to the head and neck was a small projection extending into the cavity of the hydatid. At about this stage, or a few days later, the parasites leave the liver, fall into the body cavity, and become encysted again in the organs mentioned above.

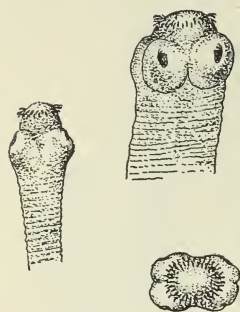


FIG. 86.—Head of the Marginate Tapeworm (*Taenia marginata*).  $\times 17$ . (Original.)

A month after infecting another shoat, Leuckart found cysticerci in the body cavity, with partially developed suckers and hooks. Six weeks after the infection of another shoat, he found cysticerci 15 mm. long encysted in the omentum, and with fully developed scolex. Three months after infecting a lamb, he found cysticerci twice as large. Experiments have also been made by other authors (Baillet, Küchenmeister, Railliet, etc.), most of them agreeing with Leuckart's experiment.

Curtice, however, takes a somewhat different view, that is, he considers the liver as a place of destruction for the young parasites, rather than a normal place for their development; he also claims that the embryos which may even travel the entire length of the intestine of the intermediate host, traverse the intestine and arrive directly in the position where they complete their larval development without first passing through the liver.

After developing into the full-grown bladder worm, the parasites remain unchanged until they are devoured by a dog or wolf, or until,

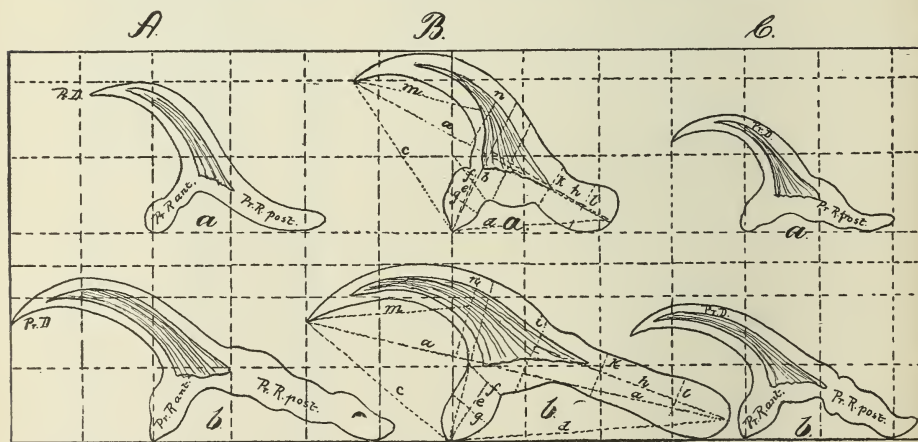


FIG. 87.—Small and large hooks of (A) *Taenia marginata*, (B) *T. serrata*, and (C) *T. coenurus*: a, small hooks; b, large hooks.  $\times 480$ . (After Deffke, 1891, Pl. II, fig. 9.)

after an undetermined length of time, they become disintegrated and more or less calcified.

If the hydatid is devoured by a dog or wolf, either when the latter prey upon the secondary host or when the dog obtains the cyst at a slaughterhouse, the bladder portion is destroyed, the scolex alone remaining



intact in the digestive fluids. The head holds fast to the intestinal wall with its suckers and hooks; by strobilation (transverse division) it

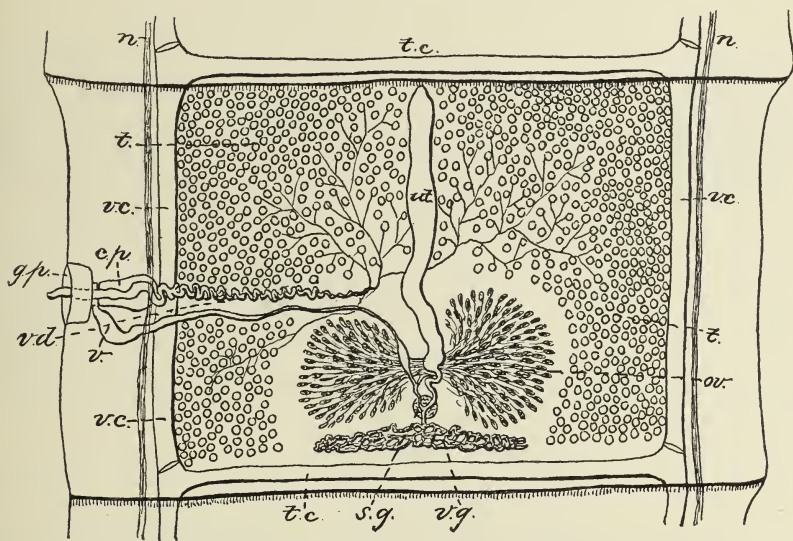


FIG. 88.—Sexually mature segment of the Marginate Tapeworm (*Taenia marginata*): *cp*, cirrus pouch; *gp*, genital pore; *n*, nerve; *ov*, ovary; *sg*, shell gland; *t*, testicles; *t.c.*, transverse canal; *ut*, uterus; *v*, vagina; *vc*, ventral canal; *vd*, vas deferens; *vg*, vitellogene gland. Enlarged. (After Deffke, 1891, Pl. I, fig. 1.)

gives rise to the segments, which, as we have already seen, together with the head, go to make up the adult tapeworm. Reproductive organs of both sexes develop in the separate segments, and eggs are

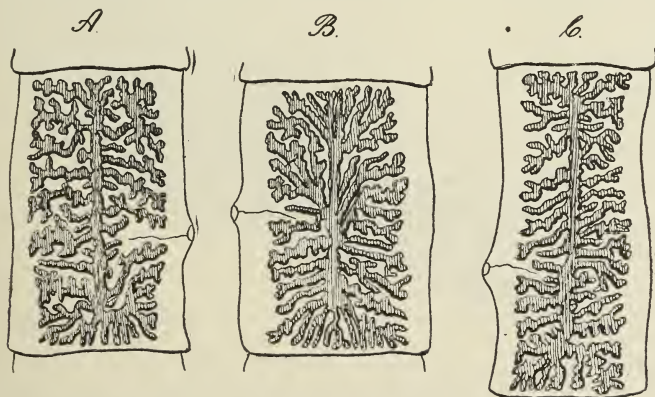


FIG. 89.—Gravid segments, showing the lateral branches of the uteri of (A) *Taenia serrata*,  $\times 4$ ; (B) *T. marginata*,  $\times 6$ ; (C) *T. coenurus*,  $\times 10-15$ . (After Leuckart, 1880, p. 720, fig. 308.)

produced within which are developed the six-hooked embryos, the point from which we started out.

*The disease in cattle, sheep, and hogs.*—As a rule, this bladder worm is a comparatively harmless parasite, a light infection having little or no

effect upon the host. A heavy infection may, however, prove fatal to young animals.

So far as I know, only one case is on record where this parasite has proven fatal to cattle—probably from the fact that no severe infections have yet been found; and from our present knowledge of the subject, it can be confidently asserted that a slight infection has little or no effect upon this host. In experiments which have been made upon sheep and pigs, it has been noticed that heavy infections have not only produced decided symptoms but have proved fatal to the animals named. Several cases (Leuckart, Zschokke, Railliet) are also reported where pigs have died from the effects of these parasites which were accidentally acquired with their food. In all of these cases the infection was very heavy. The parasites had caused peritonitis and pleurisy by their migrations from the liver and lungs to the body cavities. In a case recently described by Railliet, a shoat of two months succumbed to the disease. Baillet made



FIG. 90.—Egg of the Marginate Tapeworm (*Taenia marginata*) with six-hooked embryo, greatly magnified (original).

numerous experiments on lambs and on young goats, the animals dying in ten to fifteen days (a primordium of the scolex was noticed on cysts fifteen days old). In one of Railliet's experiments a goat died in five days.

There is no way of positively diagnosing when an animal is infested with these larvae, as the symptoms noticed on experimental animals apply



FIG. 91.—Portion of the liver of a lamb which died nine days after feeding with eggs of the Marginate Tapeworm (*Taenia marginata*), with numerous "scars," due to young parasites. (After Curtice, 1890, Pl. X, fig. 1.)

equally well to other infections. Diagnosis being uncertain or even impossible, it is useless to discuss treatment, except to remark that the parasite can not be reached with medicines; so that any treatment advised would be simply that advocated for pleurisy or peritonitis.

*Prevention* is a comparatively easy matter and lies in keeping dogs free from tapeworms.

#### ABATTOIR INSPECTION.

So far as the question of using beef, mutton, or pork from animals infested with *Cysticercus tenuicollis* as food for man is concerned, this parasite is of no importance whatever; for although several authors have attempted to infect themselves with tapeworms by swallowing this larva, all such experiments have been negative.

*Differential diagnosis.*—Infection of cattle, sheep, and hogs by *C. tenuicollis* may be mistaken for infection by *C. bovis* (p. 71), *C. cellulosae* (p. 89), *Echinococcus* (p. 113), and even for *tuberculosis*, but the differential diagnosis should not be difficult. For the differences between the Long-necked Bladder Worm and the other three larvae, see the discussions of those parasites. The condition of the corresponding lymphatic glands in tuberculosis of the host, as well as the hooks and calcareous

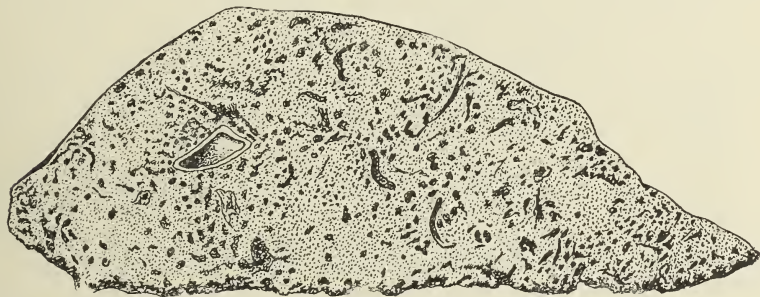


FIG. 92.—Cross section of the liver of a lamb which died nine days after feeding with eggs of the Marginate Tapeworm (*Taenia marginata*). (After Curtice, 1890,\* Pl. X, fig. 2.)

corpuscles of *C. tenuicollis*, allow a differentiation of degenerated and calcified specimens of this parasite from tuberculosis.

*Frequency of C. tenuicollis.*—In some countries the larval stage is common, especially in sheep. Olt found it in 26.4 per cent of the sheep (132 times in 500 sheep) examined at Stettin, Germany. It occurs in America, Europe, Africa, and probably elsewhere.

In connection with this parasite it is necessary to consider the adult tapeworms found in dogs.

#### THE ADULT TAPEWORMS OF DOGS.

The Marginate Tapeworm is unfortunately not the only tapeworm in the dog which proves harmful to our flocks. The following key will aid in determining the most common canine forms and show the source of infection:

##### KEY TO THE ADULT TAPEWORMS OF DOGS.

[For the forms transmissible to cattle, sheep, and swine follow Roman type.]

- (1) Four suckers on the head ..... Family *Taeniidae*, 2.  
 Two suckers on the head; genital pores ventro-median ..... *Bothriocephalus*.



- (2) Head armed with hooks; genital pores marginal..... 3.  
*Head not armed with hooks; genital pores ventro-median..... Mesocetoides.*
- (3) Head armed with a double row of hooks; genital pores on only one side of each segment..... 4.  
*Head very small, with about 60 hooks arranged in 4 rows; body 10 to 40 cm. long, with 80 to 120 quadrate to elliptical segments, the largest of which may measure 1.5 to 3 mm. broad by 8 to 10 mm. long; eggs in round capsules, about 250 in number, with 5 to 20 eggs in each capsule; eggs measure 43 to 50  $\mu$ ; larval stage in fleas and lice, which may transmit the worm to dogs or to man..... Dipylidium caninum.*
- (4) Body small, 4 to 5 mm. long, with only 3 to 4 segments, the largest of which may measure 0.6 mm. broad by 2 mm. long; 28 to 50 hooks on the head; about 60 testicles present in a segment; embryophores 32 to 36  $\mu$  by 25 to 30  $\mu$ . The eggs are transmissible to man, oxen, sheep, pigs, horses, and other mammals, and develop into the larval stage (the Echinococcus hydatid), which is very dangerous. All dogs found infested with this worm should be killed and burned..... *Taenia echinococcus*, p. 113.  
 Body much larger and with many more segments..... 5.
- (5) Segments somewhat broader than long, or square, or longer than broad..... 6.  
*Segments much broader than long, except the distal segments which suddenly elongate; head small, with 26 to 34 hooks; genital pore unusually large and prominent; embryophores 30  $\mu$ . Larval stage develops in the reindeer..... Taenia Krabbei.*
- (6) Ventral root of hooks simple..... 7.  
*Ventral root of smaller hooks bifid..... 8.*
- (7) Strobila 40 to 60 cm. long, rarely 1 m.; head pyriform, 0.8 mm. in diameter, with 22 to 32 hooks, the larger hooks 150 to 170  $\mu$  long; 220 to 250 segments present; distal 12 to 15 segments measure 8 to 12 mm. long by 3 to 4 mm. broad; 18 to 26 uterine branches (fig. 89 C) each side of median stem; about 200 testicles in each segment; embryophores spherical, 31 to 36  $\mu$ . Transmissible from dogs to lambs and calves, in which animals it causes "Gid".. *Taenia coenurus*, p. 103.  
 Strobila 1.5 to 5 m. long; head renal to square, 1 mm. broad, with 28 to 44 hooks, the larger hooks 188 to 220  $\mu$  long; 650 to 700 segments present; distal 50 to 70 segments measure 10 to 14 mm. long by 4 to 7 mm. broad; 5 to 6 or 8 uterine branches (fig. 89 B) each side of median stem; about 600 testicles in each segment; embryophores spherical, 31 to 36  $\mu$ . Transmissible from dogs to cattle, sheep, swine, etc..... *Taenia marginata*, p. 96.
- (8) Strobila 45 to 72 cm. long; head globular, 0.85 to 1.3 mm. in diameter, with 26 to 32 hooks, the larger of which measure 135 to 156  $\mu$  long; largest segments 8 to 16 mm. long with prominent posterior edge; embryophores ovoid, 33 to 41  $\mu$  by 26 to 31  $\mu$ . Transmissible to rabbits and hares..... *Taenia serialis*.  
 Strobila 60 cm. to 2 m. long; head 1 to 3 mm. in diameter, with 38 to 48 hooks, the largest measuring 225 to 250  $\mu$  long; about 400 segments present, of which the distal 30 to 40 measure 10 to 17 mm. long by 4 to 6 mm. broad; posterior edge of segments very prominent, giving strobila a serrate appearance; about 400 testicles in each segment; uterus with 8 to 10 lateral branches (fig. 89 A) each side of median stem; embryophores ovoid, 36 to 40  $\mu$  by 31 to 36  $\mu$ . Transmissible to rabbits and hares..... *Taenia serrata*.

*Tapeworm disease in dogs.*—It is the exception that the presence of tapeworms in dogs is diagnosed symptomatically, since in the majority of cases, especially in light infections, these parasites do not affect dogs to such an extent as to attract attention. Many a house dog or hunting dog harbors tapeworms without their presence ever being suspected. In some cases, however, the worms cause more or less serious pathological lesions in the intestine, which naturally bring about

pronounced symptoms, although the direct cause of the trouble is not always apparent to the diagnostician.

The general symptoms exhibited are a change in appetite, disposition to vomit, general restlessness, occasionally cramps.

The smaller species of tapeworms, *Taenia echinococcus* and *Dipylidium caninum*, have been accredited with doing more harm than the larger forms (*T. marginata*, *T. serrata*, *T. coenurus*, and *T. serialis* and *Bothriocephalus*). A heavy infection of *T. echinococcus* may cause a severe, in some cases fatal, intestinal inflammation, with hemorrhage, the dog exhibiting epileptic symptoms or even symptoms which might be mistaken for hydrophobia—change of voice, tendency to bite, weakness, paralysis of lower jaw, etc. *Dipylidium caninum* occasionally bores tunnels in the mucosa of the intestine “through which the strobila is drawn, much like a train of cars.” Schieferdecker found a peculiar hypertrophy of the intestinal villi in a dog infested with this parasite, the villi being four to five times the normal length; the glands of Lieberkühn were more or less atrophied. The same severe symptoms mentioned for infection with *T. echinococcus* have also been noticed in dogs infested with *D. caninum*. An accumulation of tapeworms may result in a stoppage of the bowels, and cases are on record of perforation of the intestinal wall by *T. serrata*.

The nervous symptoms are more pronounced in high-strung dogs. Regarding frequency, it may be stated that tapeworms are more common in butchers' dogs and stray dogs having access to slaughterhouses than in other dogs. It is claimed by some authors that male dogs are more frequently infested than female dogs, and that tapeworms are more common in large dogs and in dogs from 1 to 3 years old than in small dogs and animals under 1 year of age.

The best method of diagnosis is to examine the faeces for segments or eggs. In some cases the attention of the diagnostician is attracted to expelled segments by the dog's licking around the anus or his “sliding” on the anus. A mild laxative will generally result in the expulsion of a few segments, and this method of confirming suspicions is occasionally used.

Even if segments are not found in the excreta, it is a good plan to treat the dogs for tapeworms, so as to remove all doubts as to their presence. Dogs which come in contact with herds should certainly be treated occasionally to prevent any possibility of infecting the stock animals.

It will be noticed that the larval stages of three of these tapeworms are injurious to stock animals, namely, *T. marginata*, *T. coenurus*, and *T. echinococcus*.

The larvae of the others are of comparatively little economic impor-



FIG. 93.—Young cysticerci (*Cysticercus tenuicollis*) of the Marginate Tapeworm (*Taenia marginata*), natural size. (After Curtice, 1890, Pl. X, fig. 3a.)

tance, although it may be remarked that the larvae of *T. serrata* are sometimes fatal to rabbits, while the adult *D. caninum* sometimes occurs in children, who become infected with it by too intimate association with dogs. While playing with dogs they unconsciously get fleas upon themselves which they afterwards swallow. The fleas are digested and the larvae contained in their bodies, becoming free in the intestine, develop into tapeworms.

It is very difficult to distinguish between the adult forms of *T. coenurus* and *T. serialis*. The later is quite common in America.

If *T. echinococcus* is found to be present in a dog, the safest plan is to kill the dog and burn its carcass. The larval form of this parasite is so dangerous to man that it is not safe to have the dog around or to handle it, as is necessary in administering the treatment.

*Taenia marginata* develops in the dog, as stated elsewhere, in about ten to twelve weeks; *T. serrata* in about eight weeks; *T. coenurus* in two and a half to eight weeks.

The table following, giving the more common tapeworms in dogs, has been compiled from the various sources cited, and shows the comparative frequency of the various forms. There are as yet no extensive statistics for this country.



Number and percentage of dogs infested with tapeworms.

Locality.	Total number of dogs examined.	<i>Taenia marginata</i> .	<i>Taenia serrata</i> .	<i>Taenia coenurus</i> .	<i>Taenia serialis</i> .	<i>Taenia echinococcus</i> .	<i>Dipylidium caninum</i> .	<i>Mesocostoides lineatus</i> .	<i>Bothriocephalus</i> .	Authority.
		No.	Per cent.	No.	Per cent.	No.	Per cent.	No.	Per cent.	
Washington and elsewhere <sup>1</sup> .....	(?)	Present.	Present.	0	0	Very rare.	Common.	0	0	Stiles & Hassall (unpublished).
Washington, D. C. ....	50	1	2	0	0	0	22	44	0	Summer, 1896.
Lincoln, Nebr. ....	20	1	5	0	0	0	13	65	0	Ward, 1897, p. 172.
Iceland, 1863. ....	100	75	75	0	0	28	57	57	5	Krabbe, 1865, p. 21.
Copenhagen and vicinity, 1860-1863. ....	500	71	14.2	5	1	2	240	48	1	Krabbe, 1865, p. 4.
Copenhagen. ....	(?)	(?)	17.3	(?)	2.16	(?)	(?)	(?)	(?)	Krabbe, <sup>2</sup> 1862 or 1852?
Leipzig, Saxony. ....	(?)	(?)	27	(?)	1	(?)	(?)	(?)	(?)	Schöne, 1886.
Berlin, Prussia. ....	20	No record.	No record.	No record.	No record.	0	No record.	No record.	No record.	Naumy, 1863, p. 415.
Berlin, Prussia, 1888. ....	200	14	7	1	.5	2	80	40	1	Deffke, 1891.
Stettin. ....	12	No record.	No record.	No record.	No record.	3	25	No record.	No record.	Olt, after Ostertag, 1895, p. 424.
Zürich, Switzerland. ....	(?)	(?)	5	(?)	1.7	(?)	(?)	21	.....	Zschokke.
Lyons and vicinity, France. ....	84	11	13	1	1.2	6	75	89.2	.....	Berfolus & Chauveau, 1879, p. 309.
McLbourne, Australia, 1883. ....	10	4	40	.....	.....	5	6	60	.....	J. D. Thomas, 1884, p. 192.
Adelaide, Australia. ....	20	68	40	.....	.....	9	518	90	5	J. D. Thomas, 1882, p. 436; 1884, p. 190.
Elsewhere in South Australia, 1882-83. ....	10	No record.	.....	.....	.....	4	No record.	.....	.....	J. D. Thomas, 1884, p. 190.

<sup>1</sup>From time to time Hassall, Curtrie, Stiles, and several volunteer assistants have examined dogs in this laboratory, but none of the examinations except those made by Sommer, were conducted with a view to establishing statistics, and hence no exact records have been kept. I have personally seen adults of *T. marginata*, *T. serrata*, *T. serialis*, *T. echinococcus*, and *D. caninum*, and larvae of the four species of *taenia* collected in various parts of the United States.

<sup>2</sup>After Deffke, 1891, p. 259; Krabbe's article not in Washington.

<sup>3</sup>Recorded as "*T. inermis*" = *T. pseudo-cucumerina* = *M. lineatus*.

<sup>4</sup>Also observed one case of *T. serialis* (see B & C, 1879, p. 297), but apparently not in this lot of dogs.

<sup>5</sup>Thomas is not certain that these specific determinations were "invariably correct."

<sup>6</sup>This is recorded from the first 13 dogs examined (see Thomas, 1882, p. 436); no mention is made of the *Bothriocephalus* in the other dogs.

*Treatment.*<sup>1</sup>—The method of treatment is much the same as that followed in tapeworm disease of man; first prepare the patient by feeding him on a light diet of milk, soup, bread, etc., and then administer anthelmintics. It is important that the dog should be confined during the entire period of preparation and treatment.

In selecting a remedy, it is well to consider the following drugs. The

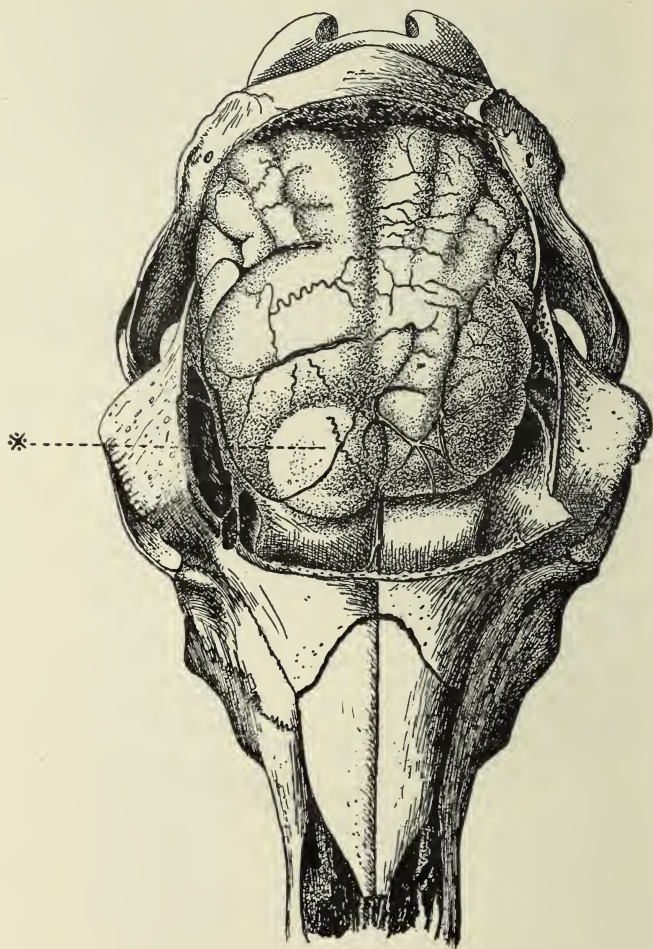


FIG. 94.—Skull of a sheep showing the brain infested with a Gid Bladder Worm\* (*Coenurus cerebralis*),  $\frac{2}{3}$  natural size. (After Railliet, 1893, p. 256, fig. 150.) See p. 108.

doses (apothecaries' weight) here given and the remarks on the drugs are abstracted from French (1896).

The doses of pelletierine tannate are, for adults, 5 to 15 grains; puppies,  $\frac{1}{2}$  to 5 grains. Pelletierine is undoubtedly the most efficient and innocuous taeniicide for the dog we possess, but is not much used on account of its expense. French

<sup>1</sup> In this connection consult French, 1896, and Curtice, 1890, pp. 77-78.

has frequently found it most useful when the stomach has refused to retain other remedies. It should be administered in gelatin-capsular form in conjunction with powdered purgatives.

*Aspidium* is perhaps the most reliable of all the vermifuges, with the exception of pelletierine. For everyday practice it is to be preferred to all other remedies when given in the form of oleoresin. Doses: For adults, 15 to 40 minims; puppies, 5 to 15 minims. The dose of the liquid extract is the same.

*Kamala* is a very efficient taeniocide with drastic purgative properties. Given in small amount as an adjunct to other taeniocides, particularly to the oleoresin of male fern, it will be found a very valuable remedy. Doses: Adults, 15 to 30 grains; puppies, 3 to 15 grains.

*Brayera* (U. S. P.), *Cusso* (B. P.), yields kosin or koussin, to which it owes its taeniocidal properties. It is one of the best and safest taeniocides, its action being directly toxic to the worm, but it is too expensive for ordinary practice. The infusion (*Infusum brayerae*, U. S. P.) and fluid extract (*Extractum brayerae fluidum*) are both too bulky and disagreeable for administration to dogs. Kosin may be given in capsules in doses: Adults, 10 to 40 grains; puppies, 10 to 20 grains. The drug usually acts as its own cathartic, but it is better to employ some adjunct for this purpose.

Powdered *areca nut*, when freshly ground, is a very good remedy for tapeworm. When old, it will generally be found inert; consequently, it is best always to purchase the nut and grind or grate on an ordinary nutmeg grater. It is still largely used by British veterinarians and is a favorite with some Americans, but it can not be regarded as being either as effectual or easy of administration as the two preceding drugs. Its effects on puppies are not unattended with danger, on account of its great astringency; but with due regard to subsequent purgation it is a perfectly safe remedy. Mayhew's method of prescribing 1 to 2 grains to every pound weight of the dog is usually followed, but the smaller quantity will generally suffice, provided the powder is freshly ground. It may be conveniently given in gelatin capsules, accompanied or followed by a purgative.

*Turpentine* is a powerful remedy against tapeworms, but it is regarded as being somewhat dangerous from its liability to produce strangury and renal inflammation. These effects are said to be less pronounced after large than after small doses; but large doses are more liable to cause gastric and enteric inflammations. It can hardly, therefore, rank with the best remedies. Administer in emulsion with white of egg, mucilage, milk or oil. Doses: Adults, 10 to 15 minims; puppies, 3 to 10 minims.

Dr. Hoskins has had very satisfactory results with this drug in puppies under 6 months of age and has never noticed any gastric or renal results. In very young puppies he rarely gives over 2 minims, carrying it up to 10 minims, and repeating for two or three days on an empty stomach in the morning, allowing no food for an hour or two after its administration.

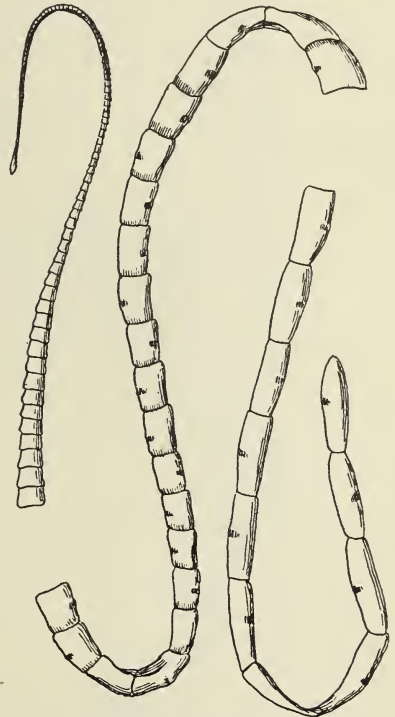


FIG. 95.—An adult Gid Tapeworm (*Taenia coenurus*), natural size. (After Railliet, 1896, p. 244, fig. 135; see also figs. 86c and 88c.) See p. 108.



The following suggestions as to doses, compiled from various sources, are taken from Curtice (1890):

- (1) Allow 2 grains of freshly powdered areca nut for each pound of the dog's

weight; administer dose in soup or milk, stirring it well, or by mixing it in butter or molasses. Follow in two hours with a tablespoonful of castor oil for a moderate-sized dog, giving the oil alone or in three times its quantity of milk.

Ziirn advises 4 drachms of areca nut for a large dog;  $2\frac{1}{2}$  drachms for a medium-sized animal, and 1 drachm for a small dog.

(2) One teaspoonful of turpentine and two tablespoonsful of castor oil given in a cup of milk; the final dose of physic is not given in this case.

(3) Twenty drops of oil of male shield fern, 30 drops of turpentine, and 60 drops of ether. Beat together with one egg and give to the dog in soup.

(4) Hagen advises 80 grains of oxide of copper with 40 grains each of powdered chalk and Armenian bolus; mix with sufficient water to make an adherent mass, and divide into 100 pills. Administer one pill three times daily for ten days in meat or butter.

(5) Röhl prescribes the following dose for large dogs; smaller doses should be given in proportion to the size of the dog:

- (a) Two drachms each of extract of male fern and of powdered male fern; or—

(b) Decoction of  $2\frac{1}{2}$  ounces of pomegranate-root bark in water, reduced to 6 fluid ounces, to which add 1 drachm of extract of male fern. Give in two doses, at intervals of one hour; or—

(c) One-half to 1 ounce of kousso, made into pills, with honey or molasses and a little meal; or—

(d) From  $1\frac{1}{2}$  to  $2\frac{1}{2}$  drachms of kamala, stirred with honey or water, and given in two doses inside of an hour.

[a, b, and c, should be followed in two hours, with castor oil, but this is not necessary for d.]

After treatment, all the faeces passed during the confinement of the patient should be collected and burned or buried in quicklime.

## 22. The Gid Bladder Worm (*Coenurus cerebralis*) of Sheep and Calves, and its adult stage, The Gid Tapeworm (*Taenia coenurus*) of Dogs.

[Figs. 87 C, 89 C, 94-100.]

The Gid Bladder Worm is an important and dangerous parasite to the sheep industry, but fortunately it does not seem to be prevalent in this country.

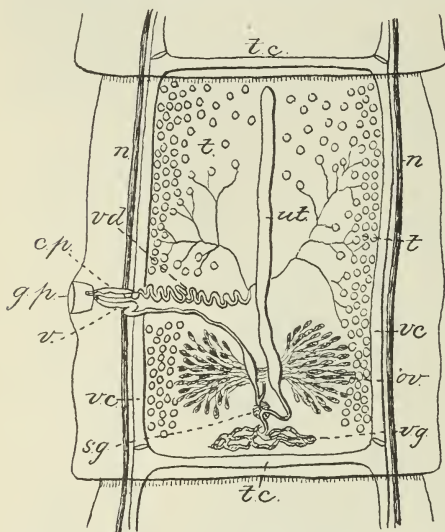


FIG. 96.—Sexually mature segment of the Gid Tapeworm (*Taenia coenurus*): cp, cirrus pouch; gp, genital pore; n, nerve; ov, ovary; sg, shell gland; t, testicles; tc, transverse canal; ut, uterus; v, vagina; vc, ventral canal; vd, vas deferens; vg, vitellogene gland.  $\times 20$ . (After Deffke, 1891, Pl. I, fig. 3.)

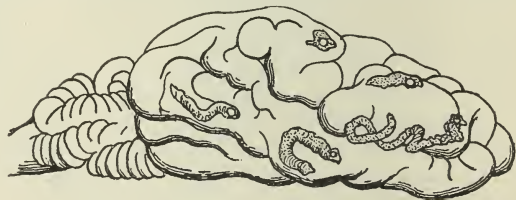


FIG. 97.—Brain of a lamb infested with young Gid Bladder worms (*Coenurus cerebralis*), natural size. (After Leuckart, 1880, p. 456, fig. 206.)

LARVAL STAGE (*Coenurus cerebralis*).

For anatomical characters, compare figs. 97, 99, 100 with key, p. 21.

SYNONYMY.—*Vermis vesicularis socialis* Bloch, 1782; *Taenia vesicularis* Goeze, 1782; *Multiceps* Goeze, 1782; *Hydatigena cerebralis* Batsch, 1786; *Vesicaria socialis* Schrank, (1788); *Taenia cerebralis* (Batsch) Gmelin, 1790; *Polycephalus ovinus* Zeder, 1803; *P. borinus* Zeder, 1803; *Coenurus cerebralis* (Batsch) Rudolphi, 1808.

HOSTS.—Calves, sheep, mufilon, goat, roedeer, reindeer, dromedary, horse. (See pp. 137-143.)

ADULT STAGE (*Taenia coenurus* Küchenmeister, 1853).

For anatomical characters, compare figs. 95 and 96 with key, p. 101.

BIBLIOGRAPHY.—For technical discussion, see especially Deffke (1891).

HOSTS.—Dogs and wolves. (See pp. 137-143.)

*Life history*.—Starting with the adult worm (fig. 95) in the intestine

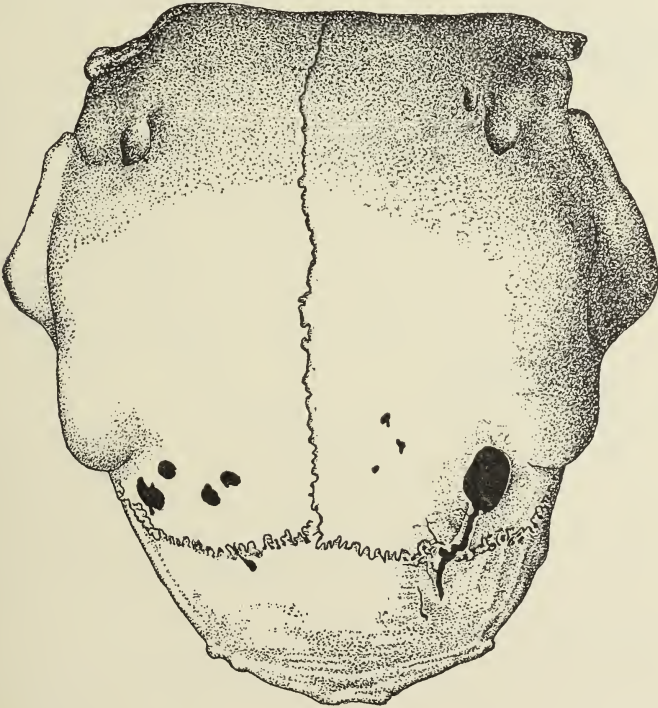


FIG. 98.—Sheep's skull, the hind portion thin and perforated, due to the presence of Gid Bladder worms (*Coenurus cerebralis*). (After Dewitz, 1892, p. 65, fig. 47.)

of the dog, the eggs are scattered on the ground, living three to four weeks in a moist place, and are taken in by the sheep or cattle along with the fodder or water. On becoming free in the intestine, the embryo bores through the intestinal wall and reaches the brain or spinal cord, probably aided in its wanderings by the blood current. Arriving in the brain, the young worm loses its hooks and develops into a cyst (fig. 97), which preserves for some time the power of locomotion and bur-

rows small galleries or canals in the nervous tissue, the canal gradually growing larger as the parasite increases in size. In fourteen to nineteen days after infection, small (0.5 to 1.5 mm.) cysts are found in the brain substance, and similar structures are sometimes found in the muscles, especially of older animals. Those in the muscles generally atrophy in a short time, but those in the brain<sup>1</sup> continue to grow, in twenty-five to forty-five days, causing the symptoms of "gid" or "staggers;" in fifty days they reach the size of a hazelnut and show the

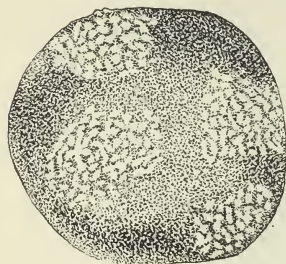


FIG. 99.—An isolated Gid Bladder Worm (*Coenurus cerebralis*), showing the heads. (After Railliet, 1886, p. 245, fig. 137.)

anlagen (primordii) of the scolices; in two to three months they complete their development. The heads (figs. 99, 100) form in invaginations generally at one end of the cyst, the invaginations growing in a bunch. If these heads are fed to dogs they develop into adult tapeworms, which produce eggs after about<sup>2</sup> four to eight weeks.

*The disease in calves and lambs.*—As intimated above, lambs are much more subject to the "gid" than are older animals, a fact which according to some authors finds its explanation in the circumstance that the embryos can not force their way through the tissues of adults, but owing to the more pliable condition of the tissues of young animals they are able to penetrate to the brain without difficulty. In the case of cattle, however, although the disease is more frequent in animals a year or so old, it is not so rare to find 4-year old or 6-year old cows also infested with the parasite.

Three stages of the disease are recognized: (1) The period of infec-

<sup>1</sup> While generally found in the nervous centers (brain, more rarely in the spinal cord), it has also been reported once in the connective tissue of sheep (Eichler), once under the skin of a calf (Nathusius), and one extremely doubtful case has been reported to us from Minnesota of its occurrence under the skin of a horse. This latter case has not been examined by the Bureau, but I would suggest that *Taenia serialis* is common in America, and considering the tissue in which this parasite was found, it is not at all improbable that the Minnesota case was one of *Coenurus serialis* (*Taenia serialis*) rather than *C. cerebralis*.

<sup>2</sup> Statements are found in the writings of various authors that *T. coenurus* becomes "ripe," "mature," or "developed" in the dog in "ten days," "three to four" or "six to eight weeks." The expressions "ripe, matured, and developed" are, however, indefinite terms, for in some writings they refer to the stage in which the genital glands are active, in other writings they refer to the gravid segments. Properly speaking, a segment is *mature* when its sexual glands are active; it is *gravid* or *ovigerous* when it contains embryos. Von Siebold found gravid segments thirty-eight days after infection; the strobilae were 16 to 26 inches long, and some segments had already been shed, showing that gravid segments were formed in less than thirty-eight days. Railliet states that according to Leuckart the distal segments "arrive at maturity" (probably meaning "gravid" in this case) after three to four weeks. According to Kreuder the worms develop in dogs "to fully-developed sexually mature tapeworms" in ten days (Zürn).



tion and migration; (2) a period of apparent though not real recovery, and, (3) the climax.

As gid is apparently not prevalent in this country, it is hardly necessary to give a detailed discussion of the symptoms and pathology. The following short account will suffice for the present:

If the parasites are located in the brain, we find the condition known as *cephalic gid*, if in the spinal cord we find *medullary gid*, also known as *lumbar gid* or *hydatid paraplegia*.

In *cephalic gid* there is at first indifference and weakness, an abnormal attitude of the head, which is of an unusually high temperature, and vascular injection of the sclerotica; pressure on the skull causes pain; the most characteristic symptom of the disease is the action of the animal in turning in circles to the right or left, the circles becoming smaller until the patient pivots around on one spot; in some cases it acts as if intoxicated, often stumbles and falls; the eyes are turned in or out, and grinding of the teeth is noticed. The exact position of the parasite determines the particular symptoms.

In *medullary gid* there is a gradual paralysis of the hind legs, paralysis of the rectum and bladder, paleness of the mucous membranes, shedding of the wool, etc.

*Cephalic gid* should not be mistaken for *vertigo* due to heat, *epilepsy*, *blindness*, or *false gid* due to grubs in the head. *Medullary gid* should not be confounded with the *trembling disease* (the Scotch *louping-ill*) or *lumbar prurigo*.

*Treatment*.—There is no medical treatment which can be suggested; surgical treatment is sometimes resorted to, but should be performed only by a veterinarian since it is necessary to locate the parasite before operating, and this can be done only by men of experience.

*Prevention*, however, can and should be practiced by every farmer. Dogs should be kept free from tapeworms. As *Taenia coenurus* develops in the dog in three to eight weeks, the treatment may be repeated two to five weeks after the first dose.

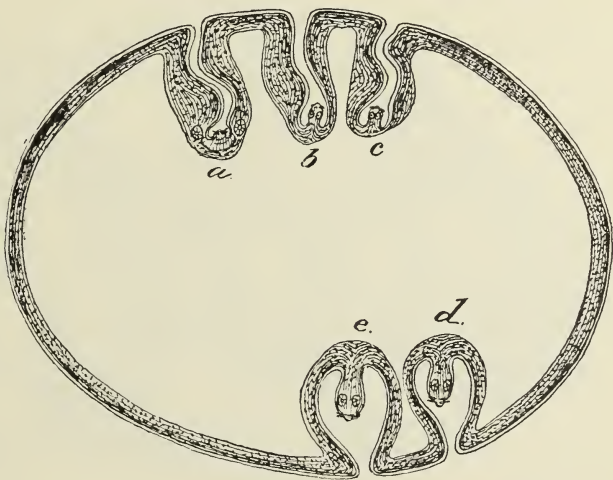


FIG. 100.—Diagrammatic section of a Gid Bladder Worm (*Coenurus cerebralis*): a, normal disposition of scolex; b, c, d, e, diagrammatic drawing to show the homology between cysticercus and coenurus. (After Railliet, 1886, p. 243, fig. 134.)

When gid is suspected in a flock of sheep or in cattle, one of the animals should be slaughtered and its skull examined for the parasite. If it is positive that gid is present, it is well to slaughter the affected sheep before the third stage of the disease sets in, as in the third stage they sometimes become very thin. The skulls of "giddy" sheep should not be fed to dogs unless they be first subjected to a long boiling, for if this precaution is not taken the infection will be spread.

The eggs retain their vitality less than twenty-four hours when exposed to an August sun (Leuckart); if kept moist they are alive after three weeks (Gerlach), but after eight weeks are unable to develop further (Leuckart).

It has been impossible for the writer to find any positive evidence of the existence of the Gid Bladder Worm in this country, yet in view of the importations from Europe of sheep and dogs, it is difficult to believe

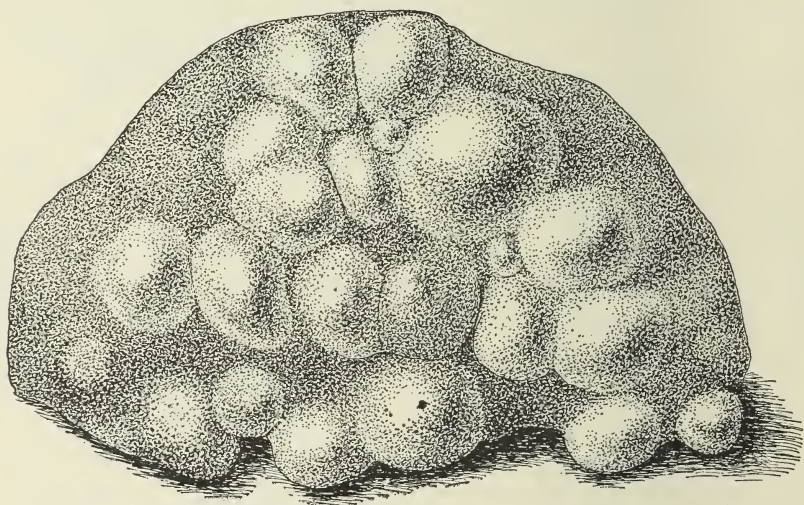


FIG. 101.—Portion of hog's liver infested with *Echinococcus hydatid*, natural size (original).

that we are entirely free from this parasite. Leidy, in 1856, makes a reference to a parasite "*Coenurus cerebralis* Rud.; in the sheep, *Capra aries*," which he evidently examined, but he gives no details as to where or when the parasite was found. One doubtful case of the presence of adult worm in dogs was recently recorded by Ward, of Nebraska, but I have examined the head of the worm and find it to be a *T. serialis*, see page 101.

#### ABATTOIR INSPECTION.

So far as infection of man is concerned, the abattoir inspection for *Coenurus cerebralis* is of no importance, for no case of *Taenia coenurus* has ever been recorded in the human species. If the parasite is found in abattoir inspection, care should be taken to dispose of it in such a way (heat) as to render an infection of dogs impossible.

*The adult tapeworm in dogs.*—*Symptoms*, etc., see page 101.

**23. The Echinococcus Hydatid (*Echinococcus polymorphus*) of Man, Cattle, Sheep, Swine, etc., and its adult stage, The Echinococcus Tapeworm (*Taenia echinococcus*) of Dogs.**

[Figs. 101-109.]

A third tapeworm of the dog, the larval form of which develops in cattle, sheep, and swine, is *Taenia echinococcus*. Since this parasite develops its larval stage in man also, and further, since it is the most dangerous animal parasite found in man, it is important to thoroughly understand its life history in order to guard against infection, although it is at present not very common in America.

LARVAL STAGE (*Echinococcus polymorphus*).

For anatomical characters, compare figs. 101, 105, 106-109 with key, p. 21.

SYNONYMY.—*Taenia visceralis socialis granulosa* Goeze, 1782; *Hydatigena granulosa* Batsch, 1786; *Vesicaria granulosa* (Batsch) Schrank, (1788); *Taenia granulosa* (Batsch) Gmelin, 1790; *Polycephalus hominis* Zeder, 1800; *Echinococcus* Rudolphi, 1802; *Polycephalus humanus* Zeder, 1803; *P. granulosa* (Batsch) Zeder, 1803; *P. echinococcus* Zeder, 1803; *Acephalocystis* Laennec, 1804; *Echinococcus granulosa* (Batsch) Rudolphi, 1805; *Hydatid erratica* Blumenbach, 1805; *Acephalocystis humana* Lüdersen, (1808); *A. suilla* Lüdersen, (1808); *Echinococcus hominis* (Zeder) Rudolphi, 1810; *E. simiae* Rudolphi, 1810; *E. veterinorum* Rudolphi, 1810; *Polycephalus granosus* Laennec, 1812; *Acephalocystis ovoides* Laennec, 1812; *A. cystifera* Laennec, 1812; *A. granosa* Laennec, 1812; *A. surculigera* Laennec, 1812; *A. intersecta* Laennec, 1812; *A. ansa*<sup>1</sup> Laennec, 1812; *Echinococcus infusorium* F. S. Leuckart, (1827); *Acephalocystis eremita sterilis* Cruvielhiehl, (-?); *A. prolifera socialis* Cruvielhiehl, (-?); *A. endogena* Kuhn, (1830); *A. exogena* Kuhn, (1830); *A. granulosa* Chiaje, 1833; *A. communis* Chiaje, 1833; *A. prolifera* Chiaje, 1833; *A. simplex* Goodsir, 1844; (??) *Diskostoma acephalocystis* Goodsir, 1844; (??) *Astoma acephalocystis* Goodsir, 1844; *Echinococcus arietis* E. Blanchard, 1842; *E. giraffae* Gervais, (-?); *E. polymorphus* Diesing, 1850; *E. pardi* Huxley, (1852); *E. scolicipariens* Küchenmeister, 1855; *E. coenuroides* Küchenmeister, 1855; *E. altricariens* Küchenmeister, 1855; (?) *Acephalocystis macaci* Cobbold, 1861; (?) *A. ovis* tragelaphi Cobbold, 1861; *Cysticercus echinococcus* (Zeder) Koeberlé, 1861; *Echinococcus cerebri* Spiering, 1862; *E. hepatis seu process. vermiformis* Scholler, 1862; *E. hydatidosus* R. Leuckart, 1863; *E. endogena* (Kuhn, 1830) Leuckart, 1863; *E. multilocularis* Leuckart, 1863; *E. lienis* Kehlberg, 1873; *E. pulmonum* Huppert, 1875; *E. multilocularis hepatis* Haffter, 1875; *E. intercranialis* Fricke, 1880; *E. simplex* Leuckart, 1880; *E. racemosus* Leuckart, 1880; *E. multiplex* Stiller, 1882; *E. alveolaris* R. Blanchard, 1886; *E. retroperitonealis* Bitter, 1886; *E. mesenterii* Surmann, 1891; *E. cerebri* Perroncito, (18—); *E. cysticus* Huber, 1891; *E. unilocularis* Huber, 1896; *E. multilocularis exulcerans* Huber, 1896; *E. osteoklastes* Huber, (?) 1896; *E. subphrenicus* Huber, 1896; "*Echinokokkus*" (!) of Schneidmühl, 1896.

BIBLIOGRAPHY.—For detailed technical discussion of the parasite, see especially Leuckart (1880, I, pp. 732-825); for discussion of hydatid disease in man, see especially Neisser (1877); J. D. Thomas (1884); Davaine (1877, pp. 356-666); for bibliography, see especially (prior to 1864) Diesing (1850, pp. 842-844, and 1864, pp. 395-397); (1861-1880)

<sup>1</sup>*A. plana* Laennec, 1812, a seventh supposed but doubtful variety described by Laennec, has since been determined as a spurious parasite, representing albuminous concretions occasionally found in the wrist, and afterwards described by Dupuytren as *Ovuligera carpi*. *A. racemosa* Cloquet, an eighth supposed variety, is another spurious parasite later determined as chorial vesicles.



Taschenberg (1889, pp. 1036-1057); (1877-1890) Huber (1891, pp. 5-39); also Billings, Index Cat. Lib. Surg. Gens. Office, United States Army, 1885, VI, pp. 530-535.

HOSTS.—Man, cattle, sheep, swine, and other animals. (See pp. 137-143.)

#### ADULT STAGE (*Taenia echinococcus* Siebold, 1853).

For anatomical characters, compare figs. 102-104 with key, p. 101.

SYNONYMY.—“*Taenia cateniformis*” misdet. pro parte Rudolphi, 1808; “*T. cucumerina* Bloch” misdet. pro parte, Diesing, 1850; “*T. serrata*” misdet. Röll, 1852; *T. echinococcus* Siebold, (1853); *T. nana* Beneden, 1858 [nec Siebold, 1852]; *Echinococcifer echinococcus* (Siebold) Weinland, 1858; “*T. echinococca*” of Koeberlé, 1861; *T. (Echinococcifer) echinococcus* of Lenckart, 1863; *T. (Arhynchotaenia) echinococcus* of Diesing, 1864; *T. (Echinococcus) echinococcus* of Railliet, 1886; *T. “echinokokkus”* of Schneidmühl, 1896.

HOSTS.—Dog, dingo, jackal, wolf, cougar (?). (See pp. 137-143.)

*Life history*.—Starting with the adult tapeworm (fig. 103) in the small intestine of the dog or wolf, the eggs are scattered over the ground and are swallowed by the intermediate host with the fodder or



FIG. 102.—Portion of the intestine of a dog infested with the adult-Hydatid Tapeworm (*Taenia echinococcus*), natural size. (After Ostertag, 1895, p. 430, fig. 99.)

water. Upon arriving in the stomach, the eggshells are destroyed and the six-hooked embryo, which is thus freed, bores its way through the intestinal wall and wanders, actively or passively (that is, carried along by the blood), to various organs of the body, liver, lungs, ovaries, bones, skull, etc., where it develops first into an *acephalocyst*, which may develop further into any of the variations given below in the description of the larval stage.

The heads which are formed, upon being devoured by a dog or wolf, then develop into adult tapeworms.

The larval stage develops rather slowly, and may persist for many years. Thus, cases are on record where the hydatid has existed for 2, 4, 8, 15, 18, and even 30 years in man, very often, however, with fatal results.

*Modifications of the hydatid cysts*.—The larval stage appears in several different forms, which have been described under various names as representing different species. It is now admitted, however, by nearly all authors, especially by zoologists, that all these forms belong to one species and have been brought about by different modes of growth. Let us assume that a six-hooked embryo has reached the liver, lungs, or some other organ of the secondary host (man, cattle, sheep, etc.).

About four weeks after the infection small cysts, scarcely 1 mm. in diameter, are noticed in the interlobular tissue of the liver, for instance. They consist of an outer cyst, formed by the connective tissue of the host, and an inner solid body, 0.25 to 0.50 mm. in diameter, which represents the young parasite. The six hooks of the embryo have been discarded and the organism consists of an outer transparent capsule—the cuticle—20 to 50  $\mu$  in thickness, and a granular content somewhat condensed on the periphery and containing cells which are not distinctly separated from one another. At the end of eight weeks the parasite has doubled in size. The cuticle, which is very elastic, grows thicker and its inner surface is covered

by a thin membrane (endocyst, parenchym layer, germinal layer) which represents the condensed granular content; this was at first solid and occupied the entire space inside the cuticle. The endocyst now incloses a cavity containing a clear watery fluid. The parasite continues to grow, the cuticle becomes stratified; the germinal layer shows a histological differentiation into small cells occupying the periphery, large cells on the inside, and granular cells occupying the irregular spaces on the surface. At the end of nineteen weeks the parasite has reached 10 to 12 mm. in diameter; the liquid in the interior contains a number of chemical compositions, the parenchym layer has grown slightly, the cuticle is about 0.2 mm. thick. When the parasite is composed of only these portions, that is, *cuticle*, *endocyst*, and the contained *liquid*, it represents the form which some authors include under the term *Acephalocystis*. If we imagine all the portions of fig. 105 absent, which are designated by the letters *a* to *z*, the portions *cu* and *pa* being left, we have before us a simple *acephalocyst* (headless echinococcus hydatid). Although the parasite frequently remains in this condition, or rather is found in this condition, the acephalocyst does not represent the final larval stage. Referring to fig. 105, *a*, we see a slight proliferation of the parenchyma. This protuberance grows gradually into the cavity of the hydatid and develops into a brood capsule, *b, c*, the cavity of which is lined by a thin cuticle. The heads of the succeeding generation of tapeworms develop in these brood capsules, but authors are not entirely agreed as to how they develop. Thus, Leuckart states that a diverticulum is formed which extends into the cavity of the hydatid cyst, that the head is formed at its base, and the diverticulum then invaginates. The successive stages may be seen in *c, d*, and *e* of fig. 105. Moniez, on the other hand, states that the head develops inside of the brood capsules, passing through the stages *f, g, h*, and *i*; he admits, however, that there is occasionally a diverticulum formed, at the end of which is developed a head, not in the manner described by Leuckart, but in the same manner as if the head had formed inside the brood capsule *f, k*. Whatever may be the mode by which these heads are formed, several (5, 10, 20, or even 34) may develop in one brood capsule. As numerous brood capsules may develop in one hydatid cyst, it is not to be wondered at that many thousand heads are sometimes found in hydatid cysts. Occasionally the brood capsules will be found ruptured, so that the heads extend free into the cavity of the hydatid (*m*), and heads are occasionally found floating free in the liquid of the cyst (*n*). The hydatid, so far as we have traced it (with *cu, pa, a-n*), is a mature larval stage such as is frequently found in animals, and if this cyst is devoured by a dog the separate heads or scolices will develop into adult tapeworms.



FIG. 103.—Adult Hydatid Tapeworm (*Taenia echinococcus*), enlarged. (After Leuckart, 1880, p. 743, fig. 316.)

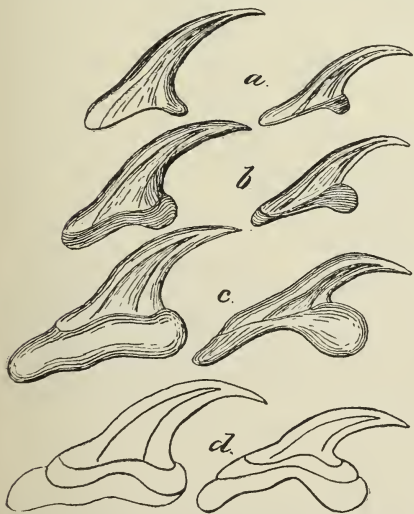


FIG. 104.—Hooks of adult Hydatid Tapeworm: *a*, from a hydatid; *b*, three weeks after feeding to a dog; *c*, from an adult; *d*, combined figures of *a-c*, showing the gradual changes in form.  $\times 600$ . (After Leuckart, 1880, p. 736, fig. 315.)

From this point, or even before it, several modes of development are open for the

a mature larval stage such as is frequently found in animals, and if this cyst is devoured by a dog the separate heads or scolices will develop into adult tapeworms.

From this point, or even before it, several modes of development are open for the

hydatid: Thus, small centers of growth (*o*, *p*, *q*, *u*) may form in the wall of the parasite. As these growths increase in size a cuticle is formed around them (*p*, *q*), and they burst through the wall in which they are growing and continue their further development in the same manner as the mother hydatid. If these so-called *daughter cysts* fall into the cavity of the mother cyst, the entire parasitic cyst (mother hydatid + daughter hydatids *r*, *x*) presents to us the form described as the *endogenous Echinococcus* (*Accephalocystis endogena* Kuhn, *Echinococcus altricipariens* Küchenmeister, and *E. hydatidosus* Leuckart), found particularly in man, hogs, and

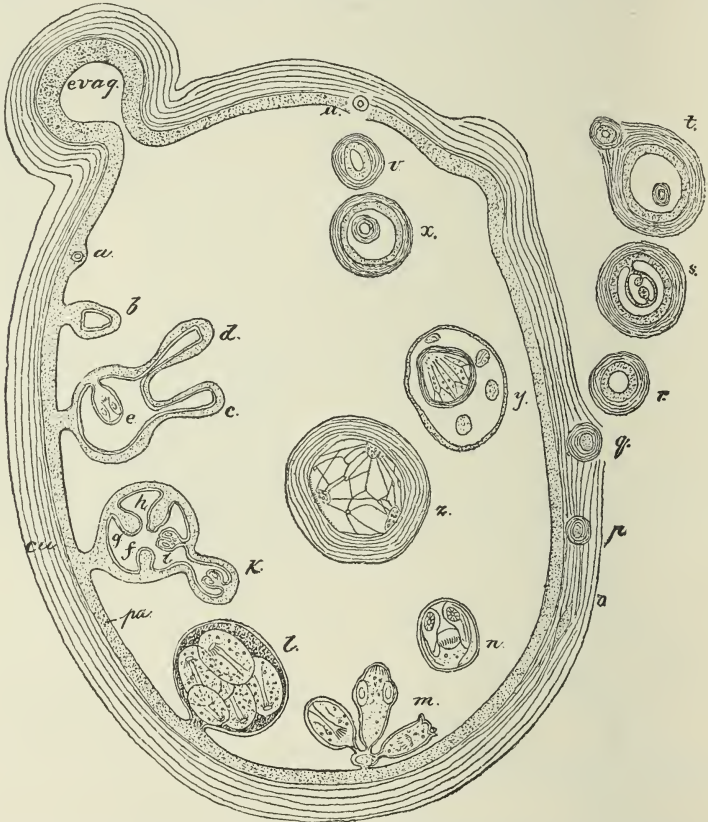


FIG. 105.—Diagram of an *Echinococcus* hydatid: *cu*, thick external cuticle; *pa*, parenchym (germinal) layer; *c*, *d*, *e*, development of the heads, according to Leuckart; *f*, *g*, *h*, *i*, *k*, development of the heads according to Moniez; *l*, fully developed brood capsule with heads; *m*, the brood capsule has ruptured, and the heads hang into the lumen of the hydatid; *n*, liberated head floating in the hydatid; *o*, *p*, *q*, *r*, *s*, mode of formation of secondary exogenous daughter cyst; *t*, daughter cyst with one endogenous and one exogenous granddaughter cyst; *u*, *v*, *x*, formation of endogenous cyst, after Kuhn and Davaine; *y*, *z*, formation of endogenous daughter cysts, after Naunyn and Leuckart; *y*, at the expense of a head; *z*, from a brood capsule; *evag*., constricted portion of the mother cyst. (After R. Blanchard, 1886, p. 426, fig. 257, slightly modified.)

horses. The growth does not necessarily stop with the daughter cysts, but a third generation of cysts (*granddaughter cysts*) may form in the same manner inside of the daughter cysts, as shown in *x*. The brood capsules of the mother cyst, or even the separate scoleces, may, according to certain authors, fall into the cavity and develop into daughter cysts. If the daughter cysts continue their growth outside of the mother cyst, as shown in *q*, *r*, *s*, *t*, we have the form described as the *exogenous Echinococcus* (*Accephalocystis exogena* Kuhn, *Echinococcus scolicipariens* Küchenmeister, *E. simplex*, and *E. granulatus* Leuckart). It will be at once seen that it is sometimes difficult to decide whether the parasite is an exogenous echinococcus or whether the cysts *s* and *t* have developed from six-hooked embryos.



In the case of *endogenous echinococcus* it would not be at all strange if we found the scolices free in the liquid *n* or a ruptured brood capsule *m*, caused by contact of the brood capsule with the daughter hydatids.

Generally, the hydatids are more or less round, but frequently diverticula (*erag.*) are noticed in the walls; for the cyst will naturally develop in the direction of the least pressure, and if this pressure is least at one particular portion of the cyst a diverticulum will naturally form at that point. This growth of diverticula leads us to the consideration of the form of hydatid known as *Echinococcus racemosus* and still another form not distinctly separated from *E. racemosus*, that is, *E. multilocularis* (*E. alveolaris*, the "*tumeur hydatique alveolaire*" of Carrière).

*E. racemosus* Leuckart, the grape Echinococcus (fig. 106), is composed of a number of cysts more or less intimately connected with each other, so as to give the appearance of a bunch of grapes or of fish spawn. It is difficult to distinguish in some cases whether the parasitic growth represents a heavy infection of small hydatids, each of which has grown from a six-hooked embryo, or whether all the cysts have arisen by budding from a single cyst. Cases of this kind have been reported in cattle by Kuhn and others.

*E. multilocularis*,<sup>1</sup> as stated, is a form of growth which is not distinctly separated from *E. racemosus*; in fact, the two may easily be classed together, as Leuckart suggests. *E. multilocularis* s. st. represents a group of small hydatids (figs. 107-109) lying close together, in many cases connected in a common stroma. This variety is found chiefly in Switzerland and Germany, where about 70 cases have been reported in the liver of man and a number of cases in cattle.

If a section is made of the parasitic growth we find numerous small caverns of irregular shape, containing a rather transparent gelatinous substance and embedded in a common substance or stroma of connective tissue, in which blood vessels and gall ducts are occasionally seen. The liver cells, however, are entirely atrophied. For many years the nature of these parasitic growths was misunderstood and they were diagnosed as colloid cancers until Virchow (1856) discovered that they were hydatids.

Four other terms which have been applied to the hydatids also need a word of explanation. Rudolphi made use of the terms *E. hominis*, *E. simiae*, and *E. veterinorum* to designate the echinococcus of man, apes, and other animals, respectively, supposing that they belonged to three separate species. Dising, however, maintained that all three forms represent the larval stage of one species and introduced the name *E. polymorphus* to designate the larval parasite, a name which zoologists now quite generally accept.



FIG. 107.—Section through a multilocular Echinococcus.  $\times 30$ . (After Leuckart, 1880, p. 796, fig. 335.)



FIG. 106.—A racemose Echinococcus, natural size. (After Leuckart, 1880, p. 795, fig. 334.)

#### HYDATID DISEASE IN VARIOUS ANIMALS.

The disease caused by the larval stage of this parasite is known as Hydatid, or Echinococcus, disease. In general terms, the hydatid may occur in any organ of the body, but is most commonly met with in the liver or lungs. The symptoms will of course vary according to the location of the parasite.

<sup>1</sup> Several authors, more particularly Müller and Mangold, consider that this form represents a distinct species. The ordinary adult is said to have plumper hooks, while the eggs are not collected in "egg balls." The adult of *E. multilocularis* is said to have more slender hooks and its eggs are described as collected in "egg balls."

It is not at all rare that the hydatids are not known to be present until discovered by post-mortem examination; they may however become very dangerous because of their situation, their volume, and the pressure they exert.



FIG. 108.—A multilocular Echinococcus from the liver of a steer, natural size. (After Ostertag, 1895, p. 427, fig. 94.)

When they occupy an important organ, when they reach a large size, and when the walls of the cysts become osseous or cartilaginous; or when numerous, they may cause serious trouble or death; they are frequently fatal when after bursting they are discharged through an organ communicating with the exterior, symptoms persisting and increasing, the expelled matter having a gangrenous odor, or when they discharge into a serous cavity or into a large blood vessel.

*Hydatid disease in cattle.*—Three cases are known where cows died suddenly which had hydatids in the heart; Fuisen is authority for the statement that the hydatids of cattle are short lived, and show a great tendency to degenerate and become calcified. (See also under "Abattoir inspection," p. 121.)

*Symptoms.*—The parasites are generally found in the liver and lungs, seldom in the heart. When in the heart symptoms are not generally exhibited unless the cyst breaks through the muscular wall and hangs into the cavities of the heart, or when the cyst discharges; in these cases apoplexy is generally the result. It is scarcely possible to diagnose echinococcus of the spleen. In echinococcus of the lungs a slight cough is first noticed, which increases according to the degree of infection and the size of the parasites, occurring at times every five or ten minutes. This cough is absent when the liver instead of the lungs is particularly infected. Respiration increases to 80 or 84 per minute. Inspiration is broken. Fever is at first absent; pulse about 70 to 85; milk secretion is lessened, appetite normal except toward the end of the disease, when the hide becomes bound, hair becomes stiff and dry. Pressure on the right side of the region of the four last ribs causes the animals to show signs of pain, and there is a dull per-

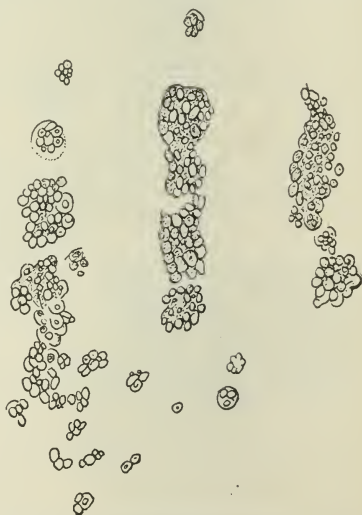


FIG. 109.—A multilocular Echinococcus from the pleura of a hog, natural size. (After Ostertag, 1895, p. 428, fig. 97.)

cussion sound similar to, though not so deep as that in pleuro-pneumonia, covering small areas or the entire breast and the region of the right lobe of the liver. Placing the ear on the chest one hears a heavy harsh breathing mixed with other sounds, whistling, rattling, or at the moment of inspiration, an exceedingly characteristic tone which Harms has named "Guurksen" (cloc-cloc of Hartenstein), and which one hears when he presses and shakes bladders filled with liquid. In liver echinococcus the labored breathing is generally absent, but digestive troubles are present, appetite and rumination become irregular; intestinal catarrh, indigestion; a yellowish color of the eyes are noticed. (Abstracts from Ziirn (1882, p. 136) and others; Harm's *Die Echinococcus-Krankheit des Rindes*, 1870, is not accessible here.)

A rectal exploration occasionally shows an enormously enlarged liver, and thus directs suspicion to the disease.

In ante-mortem examinations hydatid disease of the lungs in cattle

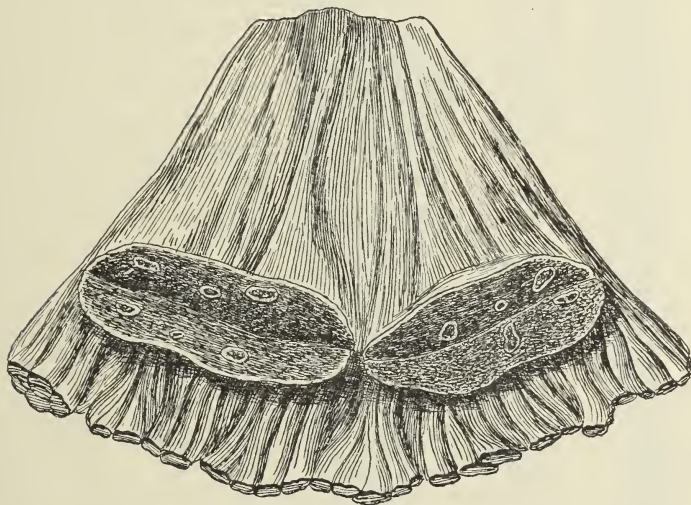


FIG. 110.—Lymphatics of a steer infested with the so-called "Tongue worm" (*Linguatula rhinaria*). (After Ostertag, 1895, p. 434, fig. 102.)

may be mistaken for pleuro-pneumonia, but in the latter disease the sounds upon percussion are deeper and duller than in the former disease. It will be recalled that contagious pleuro-pneumonia is not found in the United States.

For differential diagnosis in post-mortem examinations, see page 121.

*Hydatid disease in sheep.*—Very little is written upon this subject, but from the data published the symptoms shown by sheep are as vague and indefinite as those exhibited by cattle.

Feebleness, dullness, and indifference, though these may not be very marked, except at the last stages of the malady, when the animal is cachectic. There are frequent tympanites, and pruritus at various points; the wool is dry and brittle and easily pulled out, and, in general, the symptoms are confounded with those of *fascioliasis* (*distomatosis*). (Neumann.)



*Hydatid disease in swine.*—No particular symptoms have been described for hydatid disease in swine.

*Pathology.*—The pathological lesions naturally vary according to the organs in which the parasites are situated. There may be an enormous increase in the size and weight of the lungs or liver. The normal weight of the liver of an ox is about 5 kilograms (11 pounds), but hydatid livers have been recorded which weighed 50 kilograms (110

pounds), 130 pounds, 145 to 146 pounds, and even 158 pounds. A pig's liver weighs on an average about 2 kilograms (4.4 pounds) when normal, but hydatid livers have been recorded weighing 50 to 100 pounds. A steer's lungs, normal weight 6 pounds, may increase to 40 or 54 pounds.

The increase in size of these organs by the growth of the parasites naturally causes a displacement of other organs; the curvature of the diaphragm is changed; the intestines may be compressed and constricted; adhesions may form; the surface of the organs containing the parasites naturally assumes an abnormal outline, bulging out at points corresponding to the hydatids.

The hydatids themselves cause an atrophy of the specific tissue of the organ, the connective tissue of which proliferates and forms a capsule immediately surrounding the parasite; the surface of this capsule is smooth and glistening, and entirely separated

from the cuticle of the cyst, so that with care the parasite may be freed without injury; the capsule grows in thickness from 1 to 10 mm. After a time the cysts may undergo degeneration; the entire body may be replaced by a caseous or gelatinous amorphous mass in which hooks or remnants of the cuticle may be found. The multilocular echinococcus presents an appearance differing from that of the ordinary form and resembling a cauliflower to some extent.

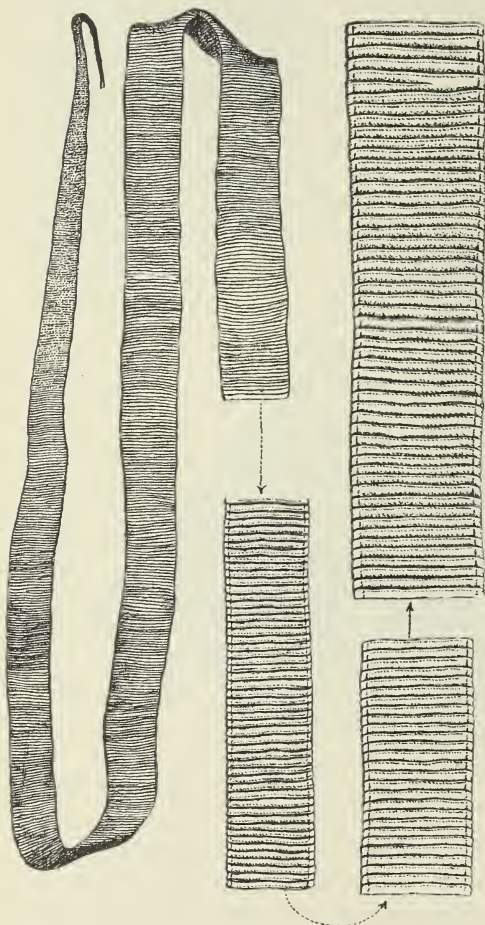


FIG. 111.—Portions of an adult Flat *Moniezia* (*Moniezia planissima*). (After Stiles & Hassall, 1893, Pl. I, fig. 1). See p. 127.

*Differential diagnosis.*—In post-mortem examination, hydatid disease, especially of the lungs, may occasionally be mistaken for tuberculosis, more particularly when the hydatids are very young and numerous, or degenerated; in tuberculosis, however, (1) the neighboring<sup>1</sup> lymphatics will generally be involved, which is not the case in hydatid disease, while (2) in hydatid disease the parasite is generally easily separated from its surrounding capsule, (3) the elastic cuticular membrane is lamellated, and (4) a microscopic examination will in some cases show the hooks of the heads. See also p. 79.

*Treatment.*—It is useless to waste time in trying to treat a domesticated animal in which echinococcus is suspected unless the animal is an especially valuable one, and unless the parasite is located in an organ which can be reached by surgical interference.

A number of methods for treatment in man have been suggested from time to time, but surgical interference is the only one which has been followed by satisfactory results. For a discussion of this subject with citation of cases, see Davaine (1879, pp. 592-663).

*Prevention.*—Keep dogs away from slaughterhouses. This will prevent their becoming infected with the tapeworms, and thus prevent their transmitting the parasite to man and animals. Stray dogs should be killed; all other dogs should be looked upon as suspicious characters, and should not be accorded the privileges of human beings.



FIG. 112.—Three views of heads of the Flat *Moniezia* (*Moniezia planissima*).  $\times 17$ . (After Stiles & Hassall, 1893, Pl. I, figs. 2-2b.) See p. 127.

#### ABATTOIR INSPECTION.

Organs infested with echinococcus are not directly harmful to man as food, since the parasite will not come to maturity in man's intestine, and there is no objection to placing these organs on the market after the portion containing the parasite has been removed. Removing and destroying the infected portions are precautions which should always be taken in order to prevent the possibility of the further infection of dogs.

The abattoir is the proper place to attack this disease, and a careful and persistent destruction of the larval stage found in meat inspection must finally result in lessening and even exterminating the disease. Heat should be used in destroying the parasite.

*Frequency of the hydatid in various animals.*—The frequency of hydatid varies greatly in different countries. According to statistics thus far published the parasite appears to be most frequent in Iceland, India, Eastern Siberia, and Australia; it is more common in Mecklenburg

<sup>1</sup> An infection of the lymphatics (fig. 110) with the so-called "Tongue worm" (*Linguatula rhinaria*) should not be mistaken for tuberculosis.

than in any other part of continental Europe. The United States seems to be comparatively free from hydatid infection, although the disease is apparently on the increase.

*United States.*—I have seen cases of hydatids in this country in cattle, hogs, the camel, and man, but as yet have seen no cases in sheep. Wheeler records 117 cases of liver echinococcus in 2,000 hogs examined at New Orleans; the cases in domesticated animals which I have examined came from the District of Columbia, Missouri, and Nebraska; Welch records it for Maryland and several of the Bureau inspectors report it for various abattoirs. (For the cases in man, see p. 124.)

*Iceland.*—The statistics for Iceland are not altogether satisfactory, but it is alleged that in some districts every sheep of three years old is infested, while it is an exception to find a cow ten years old which is free from this parasite; in some districts it is estimated that about one-third of the sheep are infested; one author estimates that one-fourth are infested.

*India.*—Seventy per cent of the cattle are infested (Neumann).

*Germany.*—The statistics for Germany are more detailed than for any other country; it must, however, be borne in mind that while some

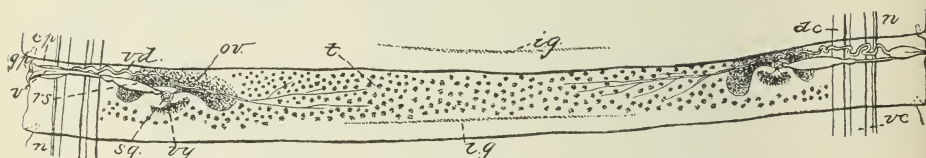


FIG. 113.—Dorsal view of sexually mature segment of the Flat Moniezia (*Moniezia planissima*): *cp*, cirrus pouch; *dc*, dorsal canal; *gp*, genital pores; *ig*, interproglottidal glands; *n*, nerve; *ov*, ovary; *rs*, receptaculum seminis; *sg*, shell gland; *t*, testis; *v*, vagina; *vc*, ventral canal; *vd*, vas deferens; *vg*, vitellogene gland. Enlarged. (After Stiles & Hassall, 1893, Pl. II, fig. 4.)

German statistics include the whole number of animals slaughtered and the entire number of cases found, other statistics leave out the calves and omit from the list those cases of light infection in which the portion containing the parasite could be excised and the rest of the organ placed upon the market. The following statistics are compiled from various sources:

Peiper (1894) takes the statistics of 52 slaughterhouses in various parts of Germany and concludes that 10.39 per cent of the cattle, 9.83 per cent of the sheep, and 6.47 per cent of the hogs harbor hydatids; the average for Greifswald, Wolgast, Anklam, Demmin, and Swinemünde (Vorpommern) was: Cattle, 37.73 per cent; sheep, 27.1 per cent; hogs, 12.8 per cent; for Greifswald alone, cattle, 64.58 per cent; sheep, 51.02 per cent; hogs, 4.93 per cent.

*Mecklenburg.*—About half of the animals are infested (Sahlmann). Cows infested to 25 per cent, sheep 15 per cent, hogs 5 per cent (Metelmann).

*Stettin.*—Cows (293:1425), 7.1 per cent; hogs (1238:16829), 7.3 per cent; sheep (3807:14717), 25.8 per cent (Olt).

*Leipzig* (one year).—Sheep (591:4515), 13.09 per cent; native hogs (196:5166), 3.79 per cent; Hungarian hogs (181:843), 27.47 per cent. In native hogs the liver (3.81 per cent) was more frequently infected than the lungs (0.26 per cent); in Hungarian hogs liver, 12.03 per cent; lungs, 14.79 per cent; in sheep the lungs (12.71 per cent) were more frequently infested than the liver (3.73 per cent). (Mejer.)



The *Berlin* statistics (quoted from Braun, 1895, who takes them from the *Berichte über die städtische Fleischbeschau in Berlin*) are especially instructive; they are here reduced to percentages in order to bring out the results more prominently:

*Number of organs of cattle, sheep, and hogs condemned for hydatids from 1888 to 1893.*

CATTLE (CALVES NOT INCLUDED).

Year.	Number examined.	Condemned for hydatids.			
		Lungs.		Livers.	
		Number.	Per cent.	Number.	Per cent.
1888-89 .....	141, 814	6, 578	4.6	2, 668	1.8
1889-90 .....	154, 218	7, 266	4.7	2, 418	1.5
1890-91 .....	124, 593	5, 792	4.6	1, 938	1.5
1891-92 .....	136, 368	4, 497	3.2	1, 721	1.2
1892-93 .....	142, 874	2, 563	1.7	739	.5

SHEEP.

1888-89 .....	338, 798	5, 041	1.4	3, 363	0.9
1889-90 .....	430, 362	5, 479	1.2	2, 742	.6
1890-91 .....	371, 943	4, 595	1.2	2, 059	.5
1891-92 .....	367, 933	4, 435	1.2	1, 669	.4
1892-93 .....	355, 949	3, 331	.9	1, 161	.3

HOGS.

1888-89 .....	479, 124	5, 910	1.2	5, 285	1.1
1889-90 .....	442, 115	6, 523	1.4	5, 078	1.1
1890-91 .....	472, 859	5, 083	1.07	3, 735	.07
1891-92 .....	530, 551	6, 037	1.1	4, 374	.08
1892-93 .....	518, 073	6, 785	1.3	4, 312	.08

1893-94 in all 13,424 lungs and 6,283 livers. (*Berichte ü. d. städtische Vieh- u. Schlachthf.*)

These statistics show that from 1888-89 to 1892-93 there has been a reduction in the number of organs condemned for hydatids both in cattle and sheep, which must be attributed to the system of abattoir inspection, and which must necessarily result in a corresponding decrease in hydatid disease in man. This reduction is not so apparent among hogs; but it must not be forgotten that Berlin slaughters large numbers of hogs imported from districts in which the slaughterhouse inspection is exceedingly superficial. We saw above that some German importations of hogs from Russian Poland, Bohemia, etc., were infected with *Cysticercus cellulosae* to 50 per cent, and hogs which are kept in such a manner as to allow this infection will certainly also bring up the German statistics of hydatids. I am strongly inclined to give much greater importance to the Berlin statistics than appears from the percentages of infection among the hogs.

THE ADULT TAPEWORM IN DOGS.

(See p. 101.) It seems to me entirely impracticable to attempt to guard against hydatid disease by trying to definitely diagnose the presence of the adult worms in dogs. If, however, the worm is found in

dogs, the latter should be killed and burned. The hydatid is altogether too dangerous a parasite in man to warrant a person's treating a dog which harbors *Taenia echinococcus*.

A decision of the "Professoren-Kollegium des Tierarznei-Instituts zu Brüssel," though amusing to Americans, is of great importance to any country in which canine flesh is used as food; that is, that the oesophagus, stomach, and intestine of all slaughtered dogs are to be excluded from the market.

#### HYDATID DISEASE IN MAN.

It is important to consider this subject in this connection in order to insist upon the necessity of destroying hydatids found at abattoirs. Hydatid disease is the most fatal zoo-parasitic disease which affects man, "50 per cent of the cases dying within five years after infection," but its occurrence in man is fortunately comparatively rare in this country. One of the volunteer assistants in the Bureau, Dr. H. O. Sommer (1895-96), has recently compiled 100 cases which have been found in the United States. Many of the cases were among foreigners, and some of these were certainly infested before coming to this country.

The 100 cases in the United States were distributed as follows:

#### BY NATIONALITY.

Nationality.	Cases.	Nationality.	Cases.	Nationality.	Cases.
Azorian .....	1	Italian .....	5	Welsh .....	1
"Colored" .....	1	Japanese .....	1	"White" .....	4
English .....	5	Mexican .....	1	Unstated .....	54
"Foreigners" .....	2	"Mulatto" .....	2		
French .....	2	Negro .....	2	Total .....	100
German .....	15	Pole .....	1		
Irish .....	2	Swede .....	1		

By sex: Males, 47; females, 28; unstated, 25.

#### BY STATES.

State.	Cases.	State.	Cases.	State.	Cases.
Alabama .....	2	Louisiana .....	1 (or 2?)	Pennsylvania .....	10
California .....	1	Massachusetts .....	5 (or 6?)	Tennessee .....	1
Connecticut .....	1	Missouri .....	7	Texas .....	1 (+?)
District of Columbia .....	4	Michigan .....	1	Vermont .....	1
Illinois .....	3	New Jersey .....	1	Virginia .....	2
Indiana .....	1	New York .....	33	Washington .....	1
Kentucky .....	2	Ohio .....	7	Unstated .....	15

Of 981 cases from various parts of the world, the greatest number occurred in persons between 21 and 40 years of age, as shown by the following classification by ages:

Years.	Cases.	Years.	Cases.
0 to 10 .....	54	51 to 60 .....	82
11 to 20 .....	152	61 to 70 .....	36
21 to 30 .....	274	71 to 80 .....	18
31 to 40 .....	225	Over 80 .....	2
41 to 50 .....	138		

In man the organs most frequently infested are the liver, lungs, kidneys, and cranial cavity. Thus, of 1,806 cases of organ infections, the liver was infested in 1,011 cases, lungs in 147, kidneys in 126, and cranial cavity in 95.

Hydatid disease is especially common in Iceland and Australia. For Iceland the statistics are very contradictory, some authors estimating that 2 per cent, others 16 $\frac{2}{3}$  per cent (probably exaggerated), of the inhabitants are infested. Three thousand cases are reported for Australia between 1861 and 1882.

In central Europe the hydatid is found on an average once in every 130 post-mortems. The frequency varies in different localities, Mecklenburg and Pomerania leading the list. Ostertag gives the following statistics:

Locality.	Cases.	Post-mortems.	Per cent.
Rostock .....	25	1,025	2.43
Breslau .....	20	1,360	1.47
Berlin .....	33	4,470	0.76
Göttingen .....	3	639	.46
Dresden .....	7	2,002	.34
Vienna .....	3	1,229	.24
Prague .....	3	1,287	.23
Erlangen .....	2	1,812	.11

Peiper collected 150 cases for Vorpommern from 1860 to 1890; in post-mortems at the Pathological Institute of Greifswald the percentage was 1.9.

*Prevention of the disease in man.*—The disease may be prevented in three ways—

(1) By recalling that the dog is not a human being and should not be treated as one. Too intimate association with dogs is sure to breed the disease in man.

(2) By preventing infection among dogs. This can be done by keeping dogs away from slaughterhouses, and by the destruction (by heat) of all hydatids found in slaughtered animals. The slaughterhouse is the best place to institute measures against hydatid disease in man.

(3) By killing all stray and ownerless dogs.

### Adult Tapeworms of Cattle and Sheep (Subfamily *Anoplocephalinae*).

Adult tapeworms are more or less frequently found in the intestines of cattle and sheep, more rarely in the bile duct of sheep. As stated on page 68, they all belong to the subfamily *Anoplocephalinae*; they are very closely related to the tapeworms of horses, hares, and rabbits, and yet are entirely distinct from these forms.

Owing to many misidentifications of tapeworms which have been published, and to the meagre descriptions of some of the species, it is impossible to state exactly how many different forms actually occur in cattle and sheep, but we are now in a position to clearly define the most common forms which occur, especially those which are found in this country, and to suppress some of the worms which have been



described as distinct species of parasites in these animals, but which in reality are identical with forms previously described under other names, or are parasites erroneously attributed to these hosts.

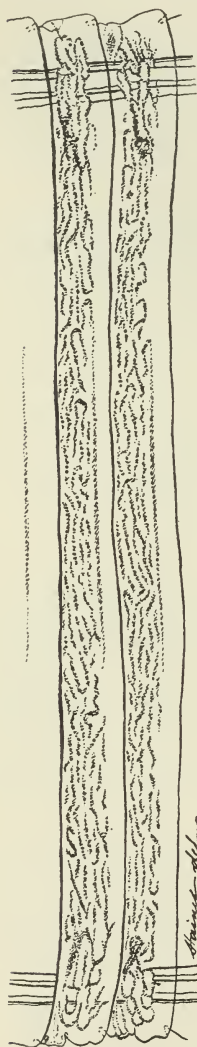


FIG. 114.—Dorsal view of gravid segments of the Flat *Moniezia* (*Moniezia planissima*), showing the uterus, enlarged. (After Stiles & Hassall, 1893, Pl. II, fig. 5.)

*S. globipunctata*, occur in sheep in other countries. *Moniezia denticulata* (= *Cittotaenia denticulata*) of the rabbit has erroneously been reported from sheep in Europe.

**Swine.**—No species of adult tapeworm is positively known to be a normal parasite in swine, but Cholodkowsky (1894, pp. 552–554) records

**Cattle.**—Eight different species of tapeworm have been reported from cattle, but in all probability only four of them are found in this host; these four species all belong to the genus *Moniezia*, and two of them, namely, *Moniezia planissima* and *M. expansa*, are found in this country.

This Bureau has knowledge of only two adult tapeworms in American cattle, but I have examined specimens of three other species, namely, *Moniezia alba*, *M. Benedeni*, and *M. denticulata*, preserved in various European collections and bearing the label that they were taken from cattle. Of these three forms, *M. denticulata* (= *Cittotaenia denticulata*) is unquestionably a parasite of rabbits instead of cattle (Stiles & Hassall, 1896), and an error must have been made in the original label; *M. alba* and *M. Benedeni* are evidently legitimate cattle parasites. Rivolta (1878) states that he examined a tapeworm collected by Perroncito from the ox which he (Rivolta) considered identical with a worm he at first labeled "*Taenia denticulata* (?)" and which he later described as *Taenia ovilla* (= *Thysanosoma Giardi*). Perroncito has, however, recently stated to Lungewitz (1895, p. 6) that he found this worm only in sheep. *Thysanosoma Giardi* is accordingly not yet established as a bovine parasite. Von Linstow (1889, p. 20) includes two other tapeworms, namely, *Stilesia centripunctata* and *S. globipunctata*, as parasites of cattle, but I am unable to find the authority for this statement.

**Sheep.**—A large number of tapeworms have been described or recorded as parasites of sheep, but the number of species must be considerably reduced, for some of the forms described as distinct species are identical with forms previously described under other names, while other forms were misdetermined. Four species, namely, *Moniezia planissima*, *M. expansa*, *M. trigonophora*, and *Thysanosoma actinoides*, are known to occur in American sheep.

Several other forms, namely, *Moniezia alba*, *M. Benedeni*, *M. Neumanni*, *M. nullicollis*, *M. Vogti*, *Thysanosoma Giardi*, *Stilesia centripunctata*, and

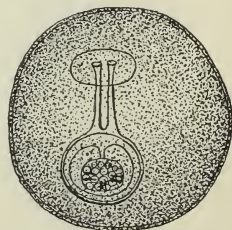


FIG. 115.—Egg of the Flat *Moniezia* (*Moniezia planissima*), greatly enlarged. (After Stiles & Hassall, 1893, Pl. II, fig. 6.)

specimens of *Thysanosoma Giardi* said to have been taken from hogs in Russia, and Detmers (1879), and Stiles (1895, pp. 220-222) have recorded three cases of other forms alleged to have occurred in this country.

The three genera of adult tapeworms for us to consider in connection with cattle, sheep, and swine are *Moniezia*, *Thysanosoma*, and *Stilesia*.

For a technical discussion of these genera and their species, with bibliographies, see Stiles & Hassall (1893) and Stiles (1896). For convenience of discussion, all of the forms will be treated together. For anatomical characters, compare figs. 111-124 with the key, page 21.

### GENUS MONIEZIA.

It is often quite difficult to distinguish between the different forms, as the specific characters must to a great extent be taken from the internal anatomy, and it is therefore necessary to make a microscopic examination of one or more specimens which have been artificially stained. In many cases, however, these characters may be recognized if a fresh worm is allowed to macerate one or two days in water; then by pressing some of the segments between two pieces of glass and holding them to the light some of the internal anatomy can be recognized.

#### 24. The White *Moniezia* (*Moniezia alba*) of Cattle and Sheep.

SYNONYMY.—*Taenia alba* Perroncito, 1879; *Moniezia alba* (Perroncito) R. Blanchard, 1891; (?) *M. alba* var. *dubia* Moniez, 1891.

This tapeworm has been recorded for France, Italy, and Algeria, but not as yet for this country. Poorly preserved specimens of *M. planissima* resemble this form in that the interproglottidal glands can not be seen distinctly. This renders it possible that *M. alba* is simply a poorly preserved *M. planissima*—a point which can not, however, be demonstrated by a comparison of the original types; on this account, it is necessary to retain both species.

#### 25. Vogt's *Moniezia* (*Moniezia Vogti*) of Sheep.

SYNONYMY.—*Taenia Vogti* Moniez, 1879; *Anoplocephala Vogti* (Moniez) Moniez, 1891; *Moniezia Vogti* (Moniez) Stiles & Hassall, 1896.

Very little is known about this supposed species, which may be a distinct form or may be a dwarfed specimen or some other species. It has been found once in France and once in England, but is not yet recorded for America.

#### 26. The Flat *Moniezia* (*Moniezia planissima*) of Cattle and Sheep.

[Figs. 111-115.]

SYNONYMY.—*Moniezia planissima* Stiles & Hassall, 1892; *Taenia* (*Moniezia*) *planissima* (Stiles & Hassall) Braun, 1895; *T. expansa* pro parte of various authors.

This seems to be the most common adult tapeworm in American cattle; it also

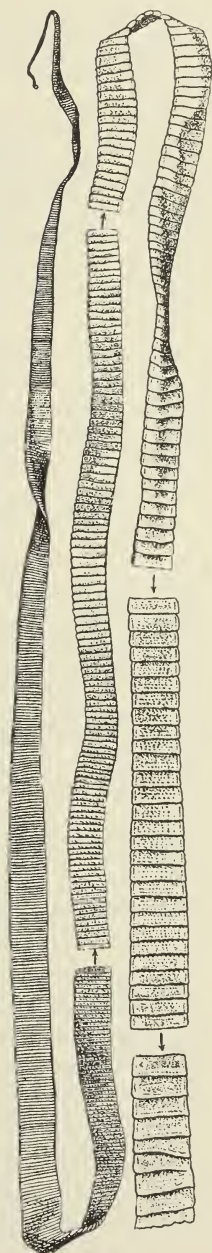


FIG. 116.—Portions of an adult specimen of the Broad *Moniezia* (*Moniezia expansa*), natural size. (After Stiles & Hassall, 1893, Pl. VI, fig. 1.)

occurs in American sheep, but is apparently not so common in this host. It is found also in France, Germany, and Italy.

**27. Van Beneden's Moniezia (*Moniezia Benedeni*) of Cattle and Sheep.**

SYNONYMY.—*Taenia Benedeni* Moniez, 1879; *Moniezia Benedeni* (Moniez) R. Blanchard, 1891.

This worm was recorded once for sheep in France and once for cattle in Austria.

**28. Neumann's Moniezia (*Moniezia Neumanni*) of Sheep.**

This worm was described by Moniez in 1891, and has been recorded only once. It was found in France.

**29. The Broad Moniezia (*Moniezia expansa*) of Cattle, Sheep, Goats, etc.**

[Figs. 116-119.]

SYNONYMY.—? *Taenia ovina* Goeze, 1782; ? *Halysis ovina* (Goeze) Zeder, 1803; ? *T. expansa* Rudolphi, 1805 (nomen nudum); *T. expansa* Rudolphi, 1810; *Alyselminthus expansus* (Rudolphi) Blainville, 1828; *Moniezia expansa* (Rudolphi) R. Blanchard, 1891; *Taenia* (*Moniezia*) *expansa* of Braun, 1895.

This worm is quite common in America and Europe, both in cattle and sheep.

**30. The Triangle Moniezia (*Moniezia trigonophora*) of Sheep.**

[Figs. 120-121.]

SYNONYMY.—*Moniezia trigonophora* Stiles & Hassall, 1893; *Taenia* (*Moniezia*) *trigonophora* (Stiles & Hassall) Braun, 1895. Also *T. expansa* and *T. Benedeni* pro parte of some authors.

This is rather a common parasite of American sheep, and is also found in France. It takes its name from the triangular arrangement of the testicles. I have seen one serious outbreak of disease in sheep due in part to this parasite and in part to the twisted wireworm (*Strongylus contortus*) of the stomach.

**Genus THYSANOSOMA.**

Represented by one species in North America and South America and one species in Europe.

**31. The Fringed Tapeworm (*Thysanosoma actinioides*) of Sheep, Deer, etc.**

[Figs. 122-124.]

SYNONYMY.—*Thysanosoma actinioides* Diesing, 1835; *Taenia fimbriata* Diesing, 1850 [nec Batsch, 1786]; "*Taenia expansa*" misdet. pro parte, of Faville, 1885; *Moniezia fimbriata* (Diesing) Moniez, 1891.

The Fringed Tapeworm is found in North America and South America, and forms at times a veritable scourge to the sheep industry of the Western plains.

*Disease.*—The disease in sheep caused by the Fringed Tapeworm has been studied in detail by Curtice (1890, pp. 91-109), who considers that next to scab it is the most important sheep disease of the Western plains. The financial loss it causes is quite extensive, and results from the failure of the lambs to fatten, the lessening of the wool, and the weakening of the animals so that they can not withstand the cold winter weather. The parasites develop slowly, and are present in considerable numbers before their presence is suspected. Toward September the lambs fail to grow as they should; in November the symptoms are



quite marked. First, the worms produce a local irritation of the intestine, which finally develops into a chronic catarrhal inflammation; their presence in the gall ducts produces similar results and obstructs the flow of bile; infected lambs are large headed, undersized, and hide-bound; their gait is rheumatic and they appear more foolish than the other sheep, standing oftener to stamp at the sheep dogs or herders, and lagging behind the flock when driven; the general symptoms are those of malnutrition, and Curtice considers them nearly identical with the symptoms of the loco disease; in fact, he states that it is extremely difficult to distinguish between the two diseases, and believes that the fact that the worms "may tend to produce de-

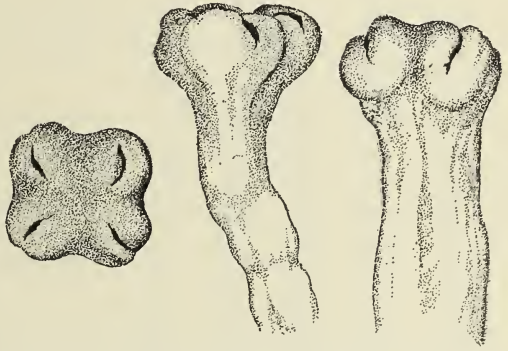


FIG. 117.—Three views of the head of the Broad *Moniezia* (*Moniezia expansa*).  $\times 17$ . (After Stiles, 1893, Pl. V, figs. 1-1b.) See p. 128.

praved appetites and a morbid craze for a particular food is also reason for suspecting that the loco disease may depend on the tapeworm disease." General systematic disturbances result from malnutrition; the usual fat is absent; serous effusions are noticed in the body cavities, serous infiltration in the connective tissue.

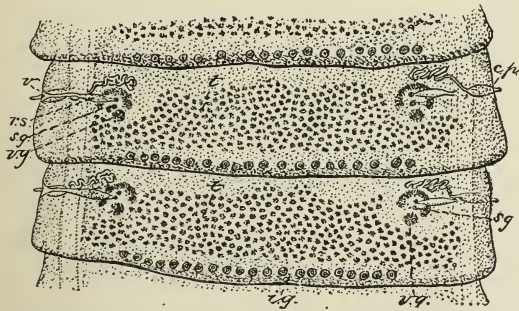


FIG. 118.—Sexually mature segments of the Broad *Moniezia* (*Moniezia expansa*): *cp*, cirrus pouch; *ig*, interproglottidal glands; *rs*, receptaculum seminis; *sg*, shell gland; *t*, testicles; *v*, vagina; *vg*, vitellogene gland. Enlarged. (After Stiles, 1893, Pl. VI, fig. 4.) See p. 128.

*Treatment.*—Curtice found that powdered preparations of pumpkin seed, pomegranate-root bark, cusso, kamala, male fern, and worm seed were of no avail, a failure due, he maintains, to the anatomical structure of the sheep's stomach and method of administration; no medicine could be used to dislodge the parasites from the gall ducts.

Personally, I have never treated sheep for the Fringed Tapeworm, but I would suggest the advisability of trying the method described on pp. 133-135.

### 32. Giard's *Thysanosoma* (*Thysanosoma Giardi*) of Cattle(?), Sheep, and Swine(?).

SYNONYMY.—*Taenia ovilla* Rivolta, 1878 [nec Gmelin, 1790]; *T. Giardi* Moniez, 1879; *T. aculeata* Perroncito, 1882; *Moniezia ovilla* (Rivolta) Moniez, 1891; *M. ovilla* 5257—No. 19—9

var. *macilenta* Moniez, 1891; *Thysanosoma Giardi* (Moniez) Stiles, 1893; *Th. ovilla* (Rivolta) Railliet, 1893; *Taenia Brandti* Cholodkowsky, 1894; *Th. ovillum* (Rivolta) Railliet, 1895.

This peculiar tapeworm has been found in sheep in France, Italy, Germany, and Russia, and has been recorded once in hogs; its occurrence as a normal parasite in both hogs and cattle is doubtful. (See pp. 126-127.)

### Genus STILESIA.

Two species of this genus are found in sheep, but neither form is yet recorded for this continent.

#### 33. The Globipunctate *Stilesia* (*Stilesia globipunctata*) of Cattle(?) and Sheep.

SYNONYMY.—*Taenia globipunctata* Rivolta (1874); *T. ovipunctata* Rivolta (1874); *Stilesia globipunctata* (Rivolta) Railliet, 1893.

Found in sheep in Italy and India; its occurrence in cattle is doubtful. (See p. 126.)

#### 34. The Centripunctate *Stilesia* (*Stilesia centripunctata*) of Cattle(?) and Sheep.

SYNONYMY.—*Taenia centripunctata* Rivolta (1874); *Stilesia centripunctata* (Rivolta) Railliet, 1893; *Taenia* (*Stilesia*) *centripunctata* of Braun, 1895.

Found in sheep in Italy and Algeria; its presence in cattle is doubtful. (See p. 126.)

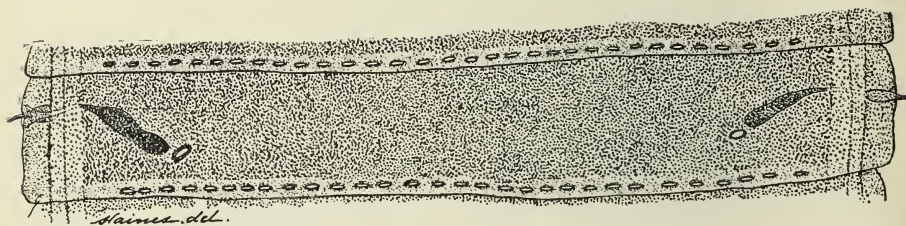


FIG. 119.—Gravid segment of the Broad Moniezia (*Moniezia expansa*), enlarged. (After Stiles, 1893, Pl. VI, fig. 6.) See p. 128.

*Life history.*—Nothing is positively known about the life history of any of the adult tapeworms of cattle or sheep; but from analogy we may assume that the life cycle is similar to that of other cestodes, namely, that the parasite runs through two stages—the adult form, in the intestine of cattle and sheep, and a larval state (a cysticercus or a cysticercoid), which will be found as a parasite in an intermediate host, probably some invertebrate animal, as an insect, snail, or worm. The intermediate host will become infected from the eggs in the faeces of the cattle and sheep, and the latter will become infected by accidentally swallowing the intermediate host.

While this is what seems to us at present as the probable life history of the bovine and ovine tapeworms, it must be distinctly remembered that no one has as yet been able to positively make out the complete life cycle. In fact, some authors (Curtice and others) do not think that it is necessary for these worms to pass through any intermediate host, but they believe that the embryos (in the eggs) are swallowed by the cattle and develop directly into adult worms. This theory, however, is contrary to analogy, and although this Bureau has repeatedly attempted

to infect animals in the manner indicated, none of the experiments can be looked upon as supporting Curtice's views, for we were unable to produce an infection.

One of the following experiments, given as illustrations, might at first sight seem to support Curtice's theory, but can equally well be explained otherwise:

(1) *September 2, 1891.*—A 6-months-old lamb fed with thousands (!) of eggs of *M. expansa*.

*October 2.*—Experiment animal showed ripe proglottids in droppings. The infection, however, was totally out of proportion to the number of embryos fed, so that the lamb must have become infected in some other way.

(2) *September 10.*—Lamb fed with thousands of eggs of *M. expansa* at three different times within a week.

*September 30.*—Lamb killed and four-hour post-mortem held. Intestinal villi, etc., examined microscopically. Result totally negative.

(3) *September 10.*—Lamb fed with thousands of eggs of *M. expansa* five times within a week. Result negative.

Experiments by Curtice and European authors must also be considered as negative, for according to the published accounts of the infections the possible sources besides direct ingestion of eggs were not sufficiently controlled.

#### TAPEWORM DISEASE OF CATTLE AND SHEEP.

For disease caused by the Fringed Tapeworm, see page 128.

*Source of infection.*—It will be impossible to make any definite statements upon this point until the complete life history of the worms is known.

*Occurrence.*—Tapeworms are found in cattle and sheep of all ages and at all times of the year, but calves, lambs, and yearlings suffer more

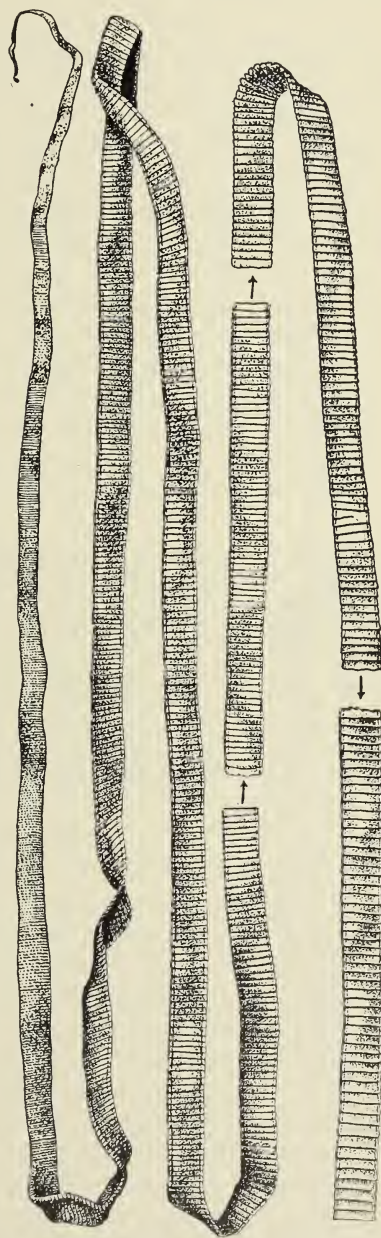


FIG. 120.—Portions of an adult specimen of the Triangle Moniezia (*Moniezia trigonophora*), natural size. (After Stiles & Hassall, 1893, Pl. VIII, fig. 1.) See p. 128.



from the effects of the parasites than do older animals. They are occasionally found in animals in stalls, but are more frequent in animals which are in pasture, and are not so frequent in the winter and early spring as in the summer and fall. Worms (*M. expansa* or *M. planissima*) from 6 to 15 feet long have been found in lambs two to four months old, so that these parasites must grow to maturity very rapidly. Curtice computes the average growth at about 1 yard per month.

*Symptoms.*—There can be no question that sheep and cattle may harbor a small number of tapeworms with comparatively little or no ill effects, for these worms are found at abattoirs in sheep which are in excellent condition at the time of slaughter. The younger the animal and the greater the infection with worms, the more serious the effects of the disease; but if able to pass through a certain period the animals are very apt to recover, for the worms seem to shed their segments quite suddenly, leaving the hosts with but small tapeworm strobila, and by the time the parasites again attain a greater length the animals may have gained in condition and strength to withstand the disease.

Tapeworms affect their hosts in several ways. By assimilating the

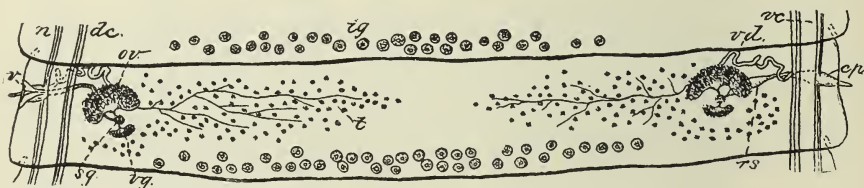


FIG. 121.—Sexually mature segments of the Triangle Moniezia (*Moniezia trigonophora*): *cp*, cirrus pouch; *dc*, dorsal canal; *ig*, interproglottidal glands; *n*, nerve; *ov*, ovary; *rs*, receptaculum seminis; *sg*, shell gland; *t*, testicles; *v*, vagina; *vc*, ventral canal; *vd*, vas deferens; *vg*, vitellogene gland. Enlarged. (After Stiles & Hassall, 1893, Pl. IX, fig. 4.) See p. 128.

nourishment in the intestinal tract of their hosts, they rob the latter of food; when present in large numbers, they may cause stoppage of the bowels, irritate the bowels, leading to non-assimilation of food and reflexly to the nervous symptoms. The clinical history is not very clearly defined from infection with other intestinal parasites, especially with the twisted strongyle (*Strongylus contortus*).

As the animals lose flesh, become poorer, and hidebound, their gait becomes unsteady, the fleece becomes dry and harsh, little yolk being present; the appetite and thirst may increase; diarrhœa is frequent in severe infections, and becomes more pronounced as the disease advances. The animals may at last become completely exhausted and die.

*Diagnosis.*—Suspicion of tapeworm disease being aroused by the general poor condition of the animals, a positive diagnosis may frequently be made by finding the cast-off segments in the droppings, or around the anus under the tail. A microscopic examination of the faeces for eggs is practicable only for experts. In case of death of one of the flock, it is best to make a careful post-mortem, examining the fourth stomach for the twisted strongyle and the intestines for tapeworms. This can easily be done by opening the intestine in a tub of warm water.

*Treatment.*<sup>1</sup>—The first thing to do in treating sheep and cattle for tapeworms is to confine the animals in a comparatively small yard and to withhold solid food the night before dosing. The animals should be kept confined until the worms are passed, then all the faeces should be collected and burned, or buried in quicklime.

Schwalenberg reported good results with kamala, dose for a lamb 3.75 grams (about 1 dram); also with cusso (koussou), dose for a lamb 7.5 grams (nearly 2 drams); still better results with kosin (koussin), dose for a lamb 12 centigrams.

Picric acid, dose 0.6 to 1.25 grams (10 to 20 grains), made into pills with meal and water, is recommended by some authors. It should be followed with a cathartic (a 4-ounce dose of Epsom salts or a 4-ounce dose of any of the bland oils).

Two-ounce dose of powdered male fern root, or, still better, the ethereal oil of male fern in dram doses, is recommended by some veterinarians. It can be given in combination with 2 to 4 ounces of castor oil.

Fröhner (1889) gives the following recipes: Take koussin, 3 grains, and of sugar 10 grains, mix, and give at one dose. The dose of tansy is from 2 to 6 drams. It forms one of the chief ingredients of Spinola's worm cake, which is fed to lambs as a preventive against worms. The recipe, sufficient for 100 sheep, is as follows: Take of tansy, calamus root, and tar, each 2½ pounds; of cooking salt, 1½ pounds; mix these with water and meal, make into cakes, and dry. This is an old and oft-repeated recipe, but I can not vouch for its efficiency. (Curtice, 1890.)

Powdered areca nut may be given to lambs in doses of 1 to 3 drams. If no passage occurs, follow in three or four hours with a cathartic.

In the recent experiments with bluestone by Hutcheon, in South Africa, against wireworm disease in sheep, it has been found that the same treatment expels tapeworms.

*Caution.*—Repeated accidents have happened from using too strong a solution or too large doses, or in giving it in such a way that the medicine gains access to the lungs. Dr. Hutcheon's method of procedure, which is here given in detail, is safe in the hands of the average farmer if the directions are followed. The person who gives stronger doses than indicated, or who is careless about the measurements, must take the entire responsibility of the miscarriage of the treatment. It is a good plan to make up a smaller quantity of the solution and try it upon a few sheep before attempting to dose the entire flock.



FIG. 122.—A adult specimen of the Fringed Tapeworm (*Thysanosoma actinioides*). (After Stiles, 1893, Pl. XI, fig. 1.) See p. 128.

<sup>1</sup> In this connection consult Curtice, 1890, pp. 120-121.

(a) *To prepare the mixture.*—Hutcheon has changed his formula slightly from time to time, the latest published proportions (February 21, 1895) reading as follows (see footnote, p. 136):

Dissolve 1 pound *avoirdupois* (1 pound = 16 ounces) of good, commercial, powdered bluestone (sulphate of copper) in 2 *imperial* quarts (=  $2\frac{2}{5}$  quarts U. S.) of boiling water; when the bluestone is *thoroughly* dissolved add  $6\frac{1}{2}$  *imperial* gallons (= 26 *imperial* quarts =  $7\frac{4}{5}$  U. S. gallons =  $31\frac{1}{5}$  U. S. quarts) of cold water, making in all 7 *imperial* gallons (or  $8\frac{2}{5}$  U. S. gallons) of water. (See footnote, p. 136.)

Use only bluestone which is of a uniform blue color; avoid that which is in conglomerate lumps with white patches and covered with a white crust.

The *equivalents* of 1 pound *avoirdupois* and of 7 *imperial* gallons in other weights and measures are as follows:

One pound *avoirdupois* = 1 pound 2 ounces 280 grains of *apothecaries'* or of *imperial* troy weight = 453.59 grams of *metric* weight.

Seven *imperial* gallons = 8 gallons 3 pints 3 fluid ounces 3 fluid drachms 56 minims (or practically 8 gallons  $3\frac{1}{4}$  pints, or  $8\frac{2}{5}$  gallons) of *apothecaries'* or *wine* measure, U. S. = 31.804409 liters (practically  $31\frac{1}{5}$  liters) *metric* system.

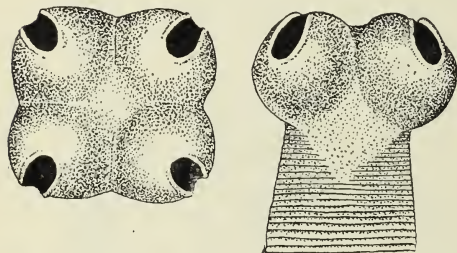


FIG. 123.—Ventral and apex views of the head of the Fringed Tapeworm (*Thysanosoma actinioides*).  $\times 17$ . (After Stiles, 1893, Pl. XI, figs. 2 and 2 b.) See p. 120.

The farmer is cautioned against guessing at the weights and measures, for this is sure to result in too strong a solution, which will kill his animals, or too weak a solution, which will fail to be effective. Scales and measures should be tested before

they are used. If reliable scales are not at hand, buy the bluestone already weighed and have the exact weight in *avoirdupois*, *apothecaries'*, or *metric* system marked on the package.

If a smaller quantity than the above is desired, this can be made up on the proportion of 1 ounce *avoirdupois* of bluestone to  $4\frac{1}{5}$  U. S. pints of water.

(b) *Preparation of the animals.*—Fast the sheep or cattle twenty to twenty-four hours before dosing. If the fast is thirty hours (longer fasts are dangerous) an extra half gallon or a gallon of water should be added to the solution, as animals are more liable to suffer after a long fast.

(c) *Size of the dose.*—Hutcheon has several times changed the size of the doses he advises, in some papers basing it on the *imperial* fluid ounce, in others on the tablespoon. The doses for sheep (in *imperial* ounces and in tablespoons) given below are his most recent (January 10, 1895) recommendations, and though based upon a solution with 5 per cent less water than the solution given above, they may be used for the weaker mixture.

We have given several of the *metric* doses to sheep on the Bureau



Experiment Station, and the sheep showed no ill effects; on the contrary they gained in weight. (See footnote, p. 136.)

Age of animals.	Approximate equivalents.			
	Table- spoons. <i>a</i>	Imperial.	U. S. apothecaries.	Metric.
For a lamb 3 months old.....	1	About $\frac{3}{4}$ fluid ounce.	About $\frac{3}{4}$ fluid ounce.	About 20 cc.
For a lamb 6 months old.....	2	About $1\frac{1}{2}$ fluid ounces.	About $1\frac{1}{2}$ fluid ounces.	About 40 cc.
For a sheep 12 months old.....	3	About $2\frac{1}{4}$ fluid ounces.	About 2 fluid ounces.	About 60 cc.
For a sheep 18 months old.....	4	About 3 fluid ounces.	About $2\frac{3}{4}$ fluid ounces.	About 80 cc.
For a sheep 24 months old.....	$4\frac{1}{2}$	About $3\frac{1}{2}$ fluid ounces.	About 3 fluid ounces.	About 90 cc.
For a calf 3 months old.....	$4\frac{1}{2}$ to 5	About $3\frac{1}{2}$ to $3\frac{3}{4}$ fluid ounces.	About 3 to $3\frac{1}{2}$ fluid ounces.	90 to 100 cc.
For a calf 6 months old.....	5 to $5\frac{1}{2}$	About $3\frac{3}{4}$ to $4\frac{1}{2}$ fluid ounces.	About $3\frac{3}{4}$ to $3\frac{3}{4}$ fluid ounces.	100 to 110 cc.

*a* "The tablespoon I refer to is the modern full-sized tablespoon (6 fluid drachms). The medicinal tablespoon contains exactly half an ounce."—HUTCHEON.

Be careful not to give a two-toothed young sheep as much as a full grown four-toothed sheep. Mistakes may occur in judging the age unless the teeth are examined.

The doses should be measured off in bottles and the point of each dose plainly marked with a file.

(*d*) *Dosing*.—In dosing, use long-necked bottles, as castor-oil bottles, Worcester sauce bottles, or anchovy sauce bottles.

Let one person set the sheep on its haunches and take its two forelegs in his left hand, while he steadies the head with the right. Another person inserts the neck of the bottle into the mouth. The head of the sheep should not be raised too high, as in that case the solution may enter the lungs and kill the sheep. A safe rule is to raise the nose to the height of the animal's eyes.

(*e*) *Overdose*.—If, after dosing, any of the sheep seem to be suffering from an overdose, indicated by lying apart from the flock, not feeding, manifesting a painful, excited look and a spasmodic movement in its running, walking with a stiff gait, purging, the discharge being a dirty brownish color, take the affected animals away from the flock to a shady place and dose with laudanum and milk as follows:

For a lamb 4 to 6 months old, 1 teaspoonful of laudanum in a tumbler of milk.

For a sheep 1 year old, 2 teaspoonfuls of laudanum in a tumbler of milk. Repeat half the dose in two to three hours if necessary.

(*f*) *After-treatment*.—The animals should not be allowed water for several hours after receiving their dose.

*Prevention*.—Preventive measures against adult tapeworm infection in sheep and cattle can be given only in the most general terms, as explicit directions can be based only upon a knowledge of the exact source of infection. The general preventive measures applicable to all intestinal parasitic diseases would apply in the case of tapeworm disease, namely: since the parasites are contracted by means of con-

taminated food or drink, prevent this contamination as much as possible; feed high with pure food and water preceding and during the time of greatest infection; avoid overcrowding of pastures; isolate infected stock; and when treating medicinally treat the entire flock if possible.

*Contamination of food and drink.*—This generally takes place by allowing manure piles to drain into the water supply or into pastures. In the case of adult tapeworms of cattle and sheep some other factors probably come into play.

*Feeding pure food and water.*—Grain, etc., should be fed from platforms or troughs, which should be kept clean; raised water troughs should be supplied, so that the animals need not be obliged to drink from stagnant pools. These water troughs should be occasionally cleaned. Many

ranchmen have already learned that by feeding their lambs extra grain during the fall, not only have their losses been di-

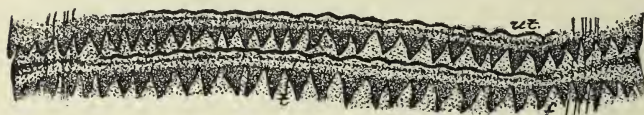


FIG. 124.—Segments of the Fringed Tapeworm (*Thysanosoma actinioides*), showing canals and nerves, and (f) fringed border, (t) testes, and (ut) uterus. Enlarged. (After Stiles, 1893, Pl. XI, fig. 8.) See p. 128.

minished, but the lambs become larger and stronger as well as fatter.

*Avoid overcrowding of pastures.*—Overcrowding of pastures is one of the surest methods of keeping animals permanently infested with animal parasites, since the chances of infecting the pasture are increased and, by being compelled to graze too close, the animals are more liable to infection from the germs of parasites found on the ground.

*Isolation of infected stock.*—This is always advisable, no matter what particular disease is present.

<sup>1</sup> *Treatment of the entire herd.*—This is advisable, since all animals which have been subject to infection stand a chance of having contracted disease, even if only in a light form; but light attacks of parasitic diseases serve to reinfect pastures.

#### ABATTOIR INSPECTION.

The abattoir inspection for tapeworms in the intestines of cattle and sheep is of no importance whatever, since none of these parasites are transmissible to man in any stage of their development. If the drainage of a slaughterhouse is not properly cared for, the surroundings form a concentrated area of infection.

<sup>1</sup> *Addenda to Hutcheon's Bluestone Treatment.*—At the moment of going to press after proof reading was completed, we have received from Hutcheon another article on this subject, dated 1897. He adopts practically the same doses given on p. 135, but changes the strength of the solution (see p. 134) to 1 pound of bluestone to "40 whiskey bottlesful of water." This is practically 1 pound to  $7\frac{1}{2}$  imperial gallons (= 9 U. S. gallons = about 34 liters metric) of water.

We wish here to repeat and emphasize the advice given to the farmer on p. 133, to make up a smaller quantity of the solution and try it on a few sheep a few days before the entire flock is dosed. This will give him an opportunity to judge whether he has made a mistake in weights and measures in mixing the solution.

## II. COMPENDIUM OF THE PARASITES, ARRANGED ACCORDING TO THEIR HOSTS.

By ALBERT HASSALL.

In the following compendium are included the hosts for all of the parasites discussed in this paper. The numbers of the hosts refer to the numbers in von Linstow's (1878) Compendium. In selecting the scientific names of hosts, I have been guided by the advice of Dr. T. S. Palmer, of the Biological Survey, U. S. Department of Agriculture.

⊕ signifies that either Stiles or I have examined the parasite for the host in question in North America.

□ signifies that either Stiles or I have examined this parasite for the host in question, but the specimen was not North American.

? signifies that I doubt the validity of the determination or the validity of the species.

† signifies that I reserve judgment upon the species.

### MAMMALS (*Mammalia*).

#### PRIMATES.

##### 1. *Homo sapiens*. Man.

<i>Dicrocoelium lanceatum</i> , p. 55.....	Liver.
<i>Fasciola hepatica</i> , p. 29.....	Liver.
? <i>Fasciola hepatica angusta</i> , p. 48.....	Lungs.
? <i>Fasciola gigantica</i> , p. 49.....	Lungs.
⊕ <i>Schistosoma haematobium</i> , p. 58.....	Veins.
<i>Bothriocephalus cordatus</i> , p. 85.....	Intestine.
⊕ <i>Bothriocephalus latus</i> , p. 85.....	Intestine.
<i>Bothriocephalus Mansoni</i> , p. 85.....	Intestine.
⊕ <i>Cysticercus cellulosae</i> , p. 89.....	Muscles, eye, and brain.
? <i>Cysticercus tenuicollis</i> , p. 96.....	Omentum.
<i>Darainea madagascariensis</i> , p. 86.....	Intestine.
<i>Dipylidium caninum</i> , p. 86.....	Intestine.
⊕ <i>Echinococcus polymorphus</i> , p. 113.....	Especially liver and lungs.
⊕ <i>Hymenolepis diminuta</i> (including <i>Taenia flavopunctata</i> ), p. 86.....	Intestine.
□ <i>Hymenolepis murina</i> (including <i>Taenia nana</i> ), p. 86.....	Intestine.
<i>Krabbea grandis</i> .....	Intestine.
⊕ † <i>Taenia confusa</i> , p. 85.....	Intestine.
⊕ <i>Taenia saginata</i> , p. 71.....	Intestine.
⊕ <i>Taenia solium</i> , p. 89.....	Intestine.

##### *Simia faunus*.

*Cysticercus tenuicollis*, p. 96.

##### 14. *Simia inuus*. (See *Macacus inuus*.)

##### 9. *Simia rubra*. (See *Cercopithecus patas*.)



19. **Simia silenus.** (*See Macacus silenus.*)  
**Semnopithecus entellus.** Hanuman langur.  
*Cysticercus tenuicollis*, p. 96.
4. **Cercopithecus cephus.**  
*Cysticercus cellulosae*, p. 89..... Peritoneum.
5. **Cercopithecus cynosurus.** Malbrouck Guenon.  
*Cysticercus tenuicollis*, p. 96..... Liver and mesentery.
6. **Cercopithecus fuliginosus.** Sooty Monkey.  
*Schistosoma haematobium* (Cobbold's *Bilharzia magna*), p. 58..... Veins.
7. **Cercopithecus mona.** Mona Guenon.  
*Cysticercus tenuicollis*, p. 96.
9. **Cercopithecus patas.** Patas Guenon.  
*Cysticercus cellulosae*, p. 89.
10. **Cercopithecus sabaeus.** Grivet Guenon.  
*Cysticercus tenuicollis*, p. 96..... Liver and mesentery.
12. **Macacus cynomolgus.** Crab-eating Macaque.  
*Cysticercus tenuicollis*, p. 96..... Liver and mesentery.  
*Echinococcus polymorphus*, p. 113..... Viscera.
14. **Macacus inuus.** Barbary Macaque.  
*Cysticercus cellulosae*, p. 89..... Peritoneum.  
*Cysticercus tenuicollis*, p. 96..... Peritoneum.  
*Echinococcus polymorphus*, p. 113..... Viscera.
19. **Macacus silenus.** Lion-tailed Macaque.  
*Echinococcus polymorphus*, p. 113..... Viscera.
12. **Inuus cynomolgus.** (*See Macacus cynomolgus.*)
14. **Inuus ecaudatus.** (*See Macacus inuus.*)
17. **Papio maimon.** Mandril.  
*Cysticercus tenuicollis*, p. 96..... Liver and mesentery.
17. **Cynocephalus maimon.** (*See Papio maimon.*)

CARNIVORES (*Carnivora*).

191. **Ursus arctos.** Brown Bear.  
*Cysticercus cellulosae*, p. 89..... Muscles.
167. **Vulpes lagopus.** Arctic Fox.  
*Taenia coenurus*, p. 109..... Intestine.
165. **Canis familiaris.** Dog.  
*Bothriocephalus cordatus*, p. 101..... Intestine.  
*Bothriocephalus fuscus*, p. 101..... Intestine.  
*Bothriocephalus latus*, p. 101..... Intestine.  
*Bothriocephalus serratus*, p. 101..... Intestine.  
*Cysticercus cellulosae*, p. 89..... Muscles and peritoneum.
- ⊕ *Dipylidium caninum*, p. 102..... Intestine.
- *Mesocostoides lineatus*, p. 102..... Intestine.
- Taenia coenurus*, p. 109..... Intestine.
- ⊕ *Taenia echinococcus*, p. 114..... Intestine.
- *Taenia Krabbei*, p. 102..... Intestine.
- ⊕ *Taenia marginata*, p. 96..... Intestine.
- ⊕ *Taenia serialis*, p. 102..... Intestine.
- ⊕ *Taenia serrata*, p. 102..... Intestine.
146. **Felis domestica.** Cat.  
 ? *Dicrocoelium lanceatum*, p. 55..... Gall bladder.  
*Fasciola hepatica*, p. 29.  
 ✓ *Cysticercus cellulosae*, p. 89.  
*Cysticercus tenuicollis*, p. 96.  
*Echinococcus polymorphus*, p. 113.

RODENTS (*Rodentia*).**Lepus californicus.***Coenurus serialis*, p. 102.**Lepus callotis.**☐ *Coenurus serialis*, p. 102.137. **Lepus cuniculus.** European Wild Rabbit.*Dicrocoelium lanceatum*, p. 55.*Fasciola hepatica*, p. 29.☐ *Coenurus serialis*, p. 102.? *Coenurus cerebralis*, p. 109.*Echinococcus polymorphus*, p. 113.137a. **Lepus cuniculus domesticus.** Common domesticated Rabbit.*Fasciola hepatica*, p. 29..... Liver.? *Coenurus cerebralis*, p. 109..... Muscles.*Coenurus serialis*, p. 102..... Muscles.140. **Lepus timidus.** Common European Hare.*Dicrocoelium lanceatum*, p. 55..... Gall bladder.*Fasciola hepatica*, p. 29..... Liver.? *Coenurus cerebralis*, p. 109..... Muscles.*Coenurus serialis*, p. 102..... Muscles.139. **Lepus variabilis.** Mountain Hare.*Dicrocoelium lanceatum*, p. 55..... Liver.*Coenurus serialis*, p. 102..... Connective tissue.**Cavia cobaya.** Guinea Pig.*Fasciola hepatica caviae*, p. 48..... Liver.110. **Mus rattus.** Black Rat.*Cysticercus cellulosae*, p. 89..... Peritoneum.98. **Castor fiber.** European Beaver.*Fasciola hepatica*, p. 29..... Liver.87. **Sciurus cinereus.***Cysticercus tenuicollis*, p. 96..... Liver and mesentery.86. **Sciurus vulgaris.** European Squirrel.*Fasciola hepatica*, p. 29..... Liver.*Cysticercus tenuicollis*, p. 96..... Liver and mesentery.UNGULATES (*Ungulata*).206. **Elephas indicus.** Indian Elephant.*Fasciola hepatica*, p. 29..... Liver.248. **Equus caballus.** Horse.☐ *Fasciola hepatica*, p. 29..... Liver.*Coenurus cerebralis*, p. 109..... Cerebrum.☐ *Echinococcus polymorphus*, p. 113..... Liver.246. **Equus asinus.** Ass.*Dicrocoelium lanceatum*, p. 55..... Liver.☐ *Fasciola hepatica*, p. 29..... Liver.☐ *Echinococcus polymorphus*, p. 113..... Liver.215. **Bos bubalis.** Indian Buffalo.*Amphistoma cerri*, p. 64..... Rumén.☐ *Fasciola hepatica aegyptiaca*, p. 48..... Liver.☐ *Gastrothylax gregarius*, p. 67..... Rumén.217b. **Bos frontalis.** Gayal.*Gastrothylax Cobboldii*, p. 67..... Rumén.*Gastrothylax elongatum*, p. 67..... Rumén.*Homalogaster Paloniae*, p. 67..... Caecum.**Bos indicus.** Zebu. (See also p. 67).*Moniezia expansa*, p. 128..... Intestine.

216. *Bos taurus*. Domesticated cattle.

<input type="checkbox"/> <i>Amphistoma cervi</i> , p. 64.....	Rumen.
<i>Amphistoma explanatum</i> , p. 67.....	Gall bladder.
<i>Amphistoma tuberculatum</i> , p. 67.....	Rumen.
<input type="checkbox"/> <i>Dicrocoelium lanceatum</i> , p. 55.....	Liver.
<i>Dicrocoelium pancreaticum</i> , p. 57.....	Pancreas.
? <i>Fasciola gigantica</i> , p. 49.....	Liver.
⊕ <i>Fasciola hepatica</i> , p. 29.....	Liver and lungs.
<input type="checkbox"/> <i>Fasciola hepatica angusta</i> , p. 48.....	Liver.
<input type="checkbox"/> <i>Fasciola hepatica aegyptiaca</i> , p. 48.....	Liver.
⊕ <i>Fasciola magna</i> , p. 49.....	Liver and lungs.
<i>Gastrothylax crumenifer</i> , p. 67.....	Rumen.
<i>Homalogaster Poirieri</i> , p. 67.....	Large intestine.
<input type="checkbox"/> <i>Schistosoma bovis</i> , p. 60.....	Veins.
? <i>Schistosoma haematobium</i> , p. 58.....	Veins.
<i>Coenurus cerebralis</i> , p. 109.....	Brain.
⊕ <i>Cysticercus bovis</i> , p. 71.....	Muscle.
⊕ <i>Cysticercus tenuicollis</i> , p. 96.....	Liver and mesentery.
⊕ <i>Echinococcus polymorphus</i> , p. 113.....	Liver and lungs.
<input type="checkbox"/> <i>Moniezia alba</i> , p. 127.....	Intestine.
<input type="checkbox"/> <i>Moniezia Benedeni</i> , p. 128.....	Intestine.
⊕ <i>Moniezia expansa</i> , p. 128.....	Intestine.
⊕ <i>Moniezia planissima</i> , p. 127.....	Intestine.
? <i>Stilesia centripunctata</i> , p. 130.....	Intestine.
? <i>Stilesia globipunctata</i> , p. 130.....	Intestine.
? <i>Thysanosoma Giardi</i> , p. 129.....	Intestine.

218. *Ovibos moschatus*. Musk Ox.

<i>Moniezia expansa</i> , p. 128.....	Intestine.
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*Ovis ammon*.

<i>Echinococcus polymorphus</i> , p. 113.
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219. *Ovis argali*. Argali.

<i>Fasciola hepatica</i> , p. 29.....	Liver.
<i>Cysticercus tenuicollis</i> , p. 96.....	Liver and mesentery.
<i>Echinococcus polymorphus</i> , p. 113.....	Liver and lungs.

220. *Ovis aries*. Domesticated sheep.

⊕ <i>Amphistoma cervi</i> , p. 64.....	Rumen.
<input type="checkbox"/> <i>Dicrocoelium lanceatum</i> , p. 55.....	Liver.
⊕ <i>Fasciola hepatica</i> , p. 29.....	Liver.
<i>Dicrocoelium pancreaticum</i> , p. 57.	
<i>Schistosoma bovis</i> , p. 60.....	Veins.
<input type="checkbox"/> <i>Coenurus cerebralis</i> , p. 109.....	Brain and spinal cord.
⊕ <i>Cysticercus tenuicollis</i> , p. 96.....	Mesentery.
<input type="checkbox"/> <i>Echinococcus polymorphus</i> , p. 113.....	Liver and lungs.
<i>Moniezia alba</i> , p. 127.....	Intestine.
<input type="checkbox"/> <i>Moniezia Benedeni</i> , p. 128.....	Intestine.
⊕ <i>Moniezia expansa</i> , p. 128.....	Intestine.
<input type="checkbox"/> <i>Moniezia Neumannii</i> , p. 128.....	Intestine.
! <input type="checkbox"/> <i>Moniezia nullicollis</i> , p. 26.....	Intestine.
⊕ <i>Moniezia planissima</i> , p. 127.....	Intestine.
⊕ <i>Moniezia trigonophora</i> , p. 128.....	Intestine.
<input type="checkbox"/> <i>Moniezia Vogti</i> , p. 127.....	Intestine.
<input type="checkbox"/> <i>Stilesia centripunctata</i> , p. 130.....	Intestine.
<input type="checkbox"/> <i>Stilesia globipunctata</i> , p. 130.....	Intestine.
⊕ <i>Thysanosoma actinioides</i> , p. 128.....	Gall ducts and intestine.
<input type="checkbox"/> <i>Thysanosoma Giardi</i> , p. 129.....	Intestine.



220. **Ovis laticauda.**  
☐ *Moniezia expansa*, p. 128..... Intestine
221. **Ovis musimon. Mufflon.**  
*Coenurus cerebralis*, p. 109..... Cerebrum.  
*Cysticercus tenuicollis*, p. 96..... Liver and mesentery.
222. **Capra hircus. Goat.**  
*Amphistoma cervi*, p. 64..... Rumens.  
*Dicrocoelium lanceatum*, p. 55..... Liver.  
*Fasciola hepatica*, p. 29..... Liver.  
*Coenurus cerebralis*, p. 109..... Brain.  
☒ *Cysticercus tenuicollis*, p. 96..... Mesentery.  
*Echinococcus polymorphus*, p. 113..... Liver and lungs.  
*Moniezia expansa*, p. 128..... Intestine.  
☐ *Moniezia caprae*..... Intestine.
- Capra pyrenaica. Spanish Ibex.**  
*Moniezia expansa*, p. 128..... Intestine.
225. **Rupicapra tragus. Chamois or Gemse.**  
*Cysticercus tenuicollis*, p. 96..... Liver and mesentery.  
*Moniezia expansa*, p. 128..... Intestine.
- Boselaphus tragocamelus. Nilgai or Blue Bull.**  
*Fasciola hepatica*, p. 29..... Liver.  
*Fasciola magna*, p. 49..... Liver.
- Hippotragus equinus. Roan Antelope.**  
*Coenurus cerebralis*, p. 109.
- Oryx beisa. Beisa.**  
*Cysticercus tenuicollis*, p. 96.
224. **Oryx leucoryx. Leucoryx.**  
*Cysticercus tenuicollis*, p. 96..... Liver and mesentery.
226. **Saiga tartarica. Saiga.**  
*Cysticercus tenuicollis*, p. 96..... Liver and mesentery.
223. **Gazella dorcas. Dorcas Gazelle.**  
*Amphistoma cervi*, p. 64..... Rumens.  
*Dicrocoelium lanceatum*, p. 55..... Liver.  
*Fasciola hepatica*, p. 29..... Liver.  
*Cysticercus tenuicollis*, p. 96..... Mesentery.  
*Moniezia expansa*, p. 128..... Intestine.
227. **Gazella euchore. Springbok.**  
*Cysticercus tenuicollis*, p. 96..... Liver and mesentery.
227. **Antelope euchore. (See Gazella euchore.)**
224. **Antelope leucoryx. (See Oryx leucoryx.)**
226. **Antelope saiga. (See Saiga tartarica.)**
- Kobus ellipsiprymus. Waterbuck.**  
*Cysticercus tenuicollis*, p. 96.
- Antilocapra americana.**  
☒ *Cysticercus bovis*, p. 71..... Muscles.
241. **Giraffa camelopardalis. Giraffe.**  
*Fasciola gigantica*, p. 49..... Liver.  
*Cysticercus bovis*, p. 71..... Muscles.  
*Echinococcus polymorphus*, p. 113..... Liver.
240. **Cariacus americanus. Virginia Deer.**  
*Fasciola hepatica*, p. 29..... Liver.  
☒ *Fasciola magna*, p. 49..... Liver.
232. **Cariacus campestris.**  
*Amphistoma cervi*, p. 64..... Rumens.  
*Moniezia expansa*, p. 128..... Intestine.

237. **Cariacus nambi.**

<i>Amphistoma cervi</i> , p. 64.....	Rumen.
<i>Moniezia expansa</i> , p. 128.....	Intestine.
<i>Thysanosoma actinioides</i> , p. 128.....	Intestine.

233. **Cariacus paludosus.**

<i>Amphistoma cervi</i> , p. 64.....	Rumen.
<i>Thysanosoma actinioides</i> , p. 128.....	Intestine.

238. **Cariacus rufus. Brocket.**

<i>Amphistoma cervi</i> , p. 64.....	Rumen.
<i>Cysticercus tenuicollis</i> , p. 96.....	Liver and mesentery.
<i>Moniezia expansa</i> , p. 128.....	Intestine.
<i>Thysanosoma actinioides</i> , p. 128.....	Intestine.

238. **Mazama rufus. (See Cariacus rufus.)****Cariacus simplicicornis.**

<i>Amphistoma cervi</i> , p. 64.....	Rumen.
<i>Cysticercus tenuicollis</i> , p. 96.....	Liver and mesentery.
<i>Thysanosoma actinioides</i> , p. 128.....	Intestine.

240. **Cariacus virginianus. (See Cariacus americanus.)**234. **Capreolus caprea. Roe Deer.**

<i>Amphistoma cervi</i> , p. 64.....	Rumen.
<i>Fasciola hepatica</i> , p. 29.....	Liver.
<i>Coenurus cerebralis</i> , p. 109.....	Brain.
<i>Cysticercus cellulosae</i> , p. 89.....	Liver and mesentery.
<i>Cysticercus tenuicollis</i> , p. 96.....	
<i>Moniezia expansa</i> , p. 128.....	Intestine.
<i>Taenia crucigera</i> .....	Intestine.

230. **Alce alces. European Elk.**

<i>Amphistoma cervi</i> , p. 64.....	Rumen.
<i>Echinococcus polymorphus</i> , p. 113.....	

230. **Alces machlis. (See Alce alces.)**230. **Alces palmatus. (See Alce alces.)**239. **Tarandus rangifer. Reindeer or Caribou.**

<i>Coenurus cerebralis</i> , p. 109.....	Brain.
<i>Cysticercus tenuicollis</i> , p. 96.....	Liver and mesentery.

230. **Cervus alces. (See Alce alces.)**231. **Cervus axis. Axis deer.**

<i>Cysticercus tenuicollis</i> , p. 96.....	Liver and mesentery.
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**Cervus canadensis. Elk or Wapiti.**

<i>Fasciola magna</i> , p. 49.....	Liver.
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235. **Cervus dama. Fallow Deer.**

<i>Amphistoma cervi</i> , p. 64.....	Rumen.
<i>Dicrocoelium lanceatum</i> , p. 55.....	Liver.
<i>Fasciola hepatica</i> , p. 29.....	Liver.
□ <i>Fasciola magna</i> , p. 49.....	Liver.

236. **Cervus elaphus. Stag.**

<i>Amphistoma cervi</i> , p. 64.....	Rumen.
<i>Dicrocoelium lanceatum</i> , p. 55.....	Liver.
<i>Fasciola hepatica</i> , p. 29.....	Liver.
<i>Fasciola magna</i> , p. 49.....	Liver.
<i>Cysticercus tenuicollis</i> , p. 96.....	Liver and mesentery.

**Cervus tarandus. (See Tarandus rangifer.)****Cervus unicolor. Sanbur, Rusa Deer.**

<i>Coenurus cerebralis</i> , p. 109.....	Brain.
<i>Cysticercus tenuicollis</i> , p. 96.....	Liver and mesentery.

244. **Auchenia llama. Llama.**  
*Dicrocoelium lanceatum*, p. 55..... Liver.  
 ☐ *Cysticercus bovis*, p. 71..... Muscles.
243. **Camelus bactrianus. Bactrian Camel.**  
*Fasciola hepatica*, p. 29..... Liver.  
 ☐ *Echinococcus polymorphus*, p. 113..... Liver and viscera.
243. **Camelus dromedarius. Dromedary.**  
*Coenurus cerebralis*, p. 109..... Brain.  
*Echinococcus polymorphus*, p. 113..... Viscera.
213. **Phachochoerus africanus. Aelian's Wart Hog.**  
*Cysticercus tenuicollis*, p. 96.....
214. **Phachochoerus aethiopicus. Pallas' Wart Hog.**  
*Cysticercus tenuicollis*, p. 96..... Abdomen.
210. **Potamochoerus porcus. Red River Hog.**  
*Cysticercus tenuicollis*, p. 96..... Omentum.
210. **Potamochoerus penicillatus. (See Potamochoerus porcus.)**
208. **Sus scrofa. Wild boar.**  
*Cysticercus cellulosae*, p. 89..... Muscles.  
*Cysticercus tenuicollis*, p. 96..... Omentum.
209. **Sus scrofa domestica. Domesticated swine.**  
*Agamodistomum suis*, p. 28..... Muscles.  
*Dicrocoelium lanceatum*, p. 55..... Liver.  
*Fasciola hepatica*, p. 29..... Liver.  
 ☐ *Cysticercus cellulosae*, p. 89..... Muscles.  
 ☐ *Cysticercus tenuicollis*, p. 96..... Omentum.  
*Thysanosoma Giardi*, p. 129..... Intestine.

CETACEANS (*Cetacea*).

- Orca gladiator. Grampus or Killer.**  
 ☐ *Fasciola hepatica*, p. 29..... Liver.

MARSUPIALS (*Marsupialia*).

283. **Macropus giganteus. Gray Kangaroo.**  
*Fasciola hepatica*, p. 29..... Liver.  
*Echinococcus polymorphus*, p. 113.
- Macropus major.**  
*Echinococcus polymorphus*, p. 113.

MOLLUSKS (*Mollusca*).

- Limnaea oahuensis.**  
*Fasciola hepatica*, p. 29.
- Limnaea rubella.**  
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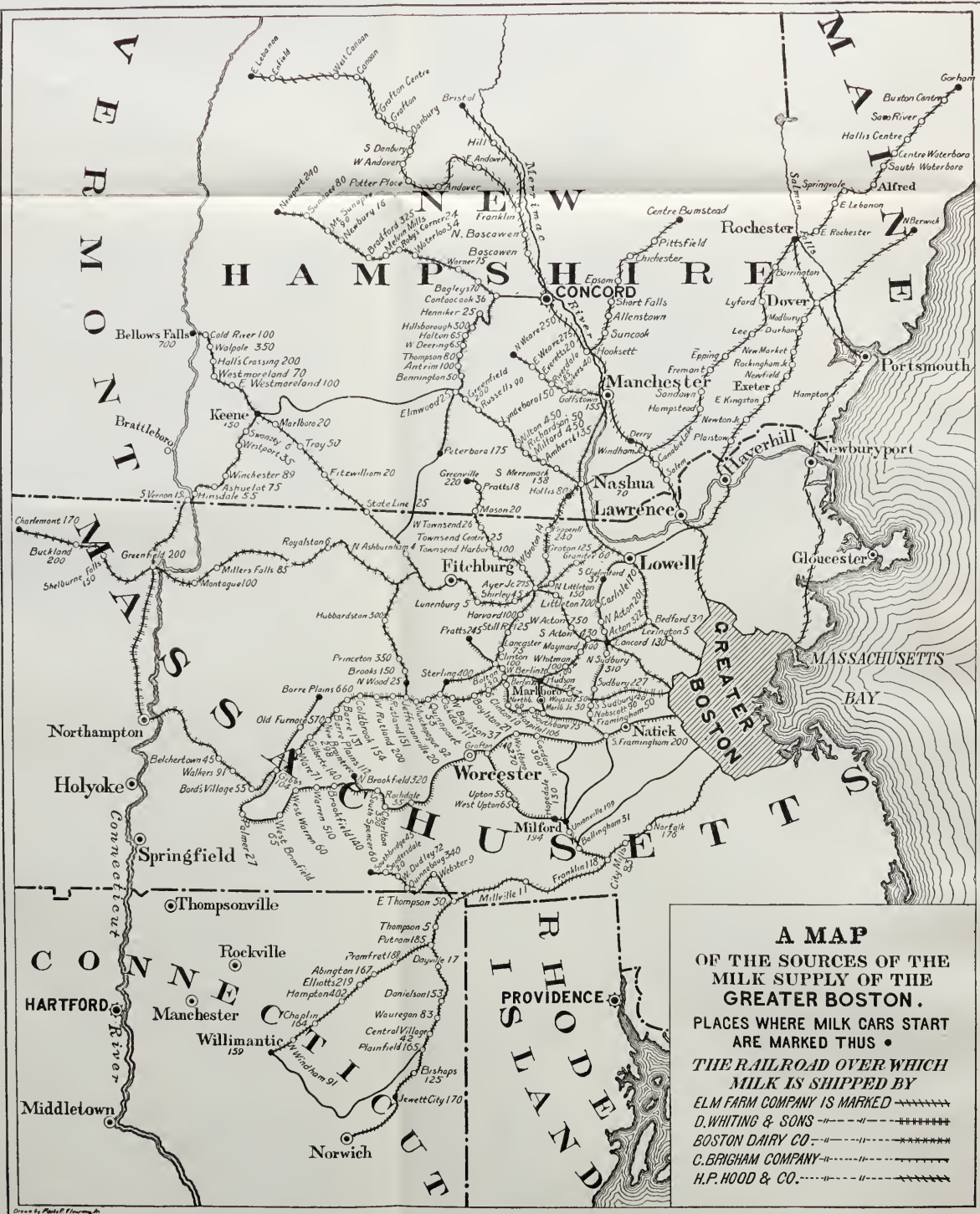
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U. S. DEPARTMENT OF AGRICULTURE.  
BUREAU OF ANIMAL INDUSTRY.

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THE MILK SUPPLY OF BOSTON  
AND OTHER NEW ENGLAND CITIES.

BY

GEORGE M. WHITAKER, M. A.,  
SPECIAL EXPERT AGENT, DAIRY DIVISION.

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Under the direction of  
Dr. D. E. SALMON,  
Chief of the Bureau of Animal Industry.



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## LETTER OF TRANSMITTAL.

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U. S. DEPARTMENT OF AGRICULTURE,  
BUREAU OF ANIMAL INDUSTRY,  
*Washington, D. C., January 18, 1898.*

SIR: I have the honor to transmit herewith, for publication as a bulletin of this Bureau, a report on the milk supply of Boston and other cities in the New England States, prepared under the immediate supervision of Maj. Henry E. Alvord, Chief of Dairy Division, by George M. Whitaker, M. A., special agent of that division.

Mr. Whitaker is the acting executive officer of the Massachusetts State Dairy Bureau, and has been for some years secretary of the New England Milk Producers' Union. He has made the subject of city milk supply a special study, and this report contains much information of general interest.

Very respectfully,

D. E. SALMON,  
*Chief of Bureau of Animal Industry.*

Hon. JAMES WILSON,  
*Secretary of Agriculture.*





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# THE MILK SUPPLY OF BOSTON AND OTHER NEW ENGLAND CITIES.

## POPULATION.

The New England States, by the census of 1890, have a population of nearly 5,000,000 people, divided as follows:

Massachusetts .....	2, 238, 943
Connecticut .....	746, 258
Maine .....	661, 086
New Hampshire.....	376, 530
Rhode Island .....	345, 506
Vermont.....	332, 422
Total.....	4, 700, 745

Massachusetts, by the State census of 1895, has a population of 2,500,183. Fifty per cent of these people live in the cities or large towns—those of 10,000 population or above. Forty-one per cent of the population of New England live in cities of over 20,000 inhabitants. Boston is the largest city and the commercial center of New England, with a population of 496,920 (census of 1895). This one city therefore contains 10 per cent of all the population of New England; more than any one of the States of Rhode Island, New Hampshire, or Vermont. But Boston is surrounded by a group of towns and cities, twenty-three in all, which, according to the State census of 1895, have a total population of 451,000, as follows:

Cambridge .....	81, 000	Medford.....	14, 000
Lynn .....	62, 000	Hyde Park .....	11, 000
Somerville .....	52, 000	Melrose .....	12, 000
Chelsea .....	31, 000	Stoneham .....	6, 000
Newton .....	27, 000	Arlington .....	6, 000
Malden .....	29, 000	Belmont.....	3, 000
Waltham.....	20, 000	Saugus.....	4, 000
Quincy.....	20, 000	Winchester .....	6, 000
Woburn.....	14, 000	Watertown.....	7, 000
Brookline .....	16, 000	Revere .....	7, 000
Everett .....	18, 000	Milton .....	5, 000

The interests of these towns are closely allied with those of Boston, and their business men to a large extent do business in Boston. The business interests of this section are identical, though it includes twenty-four separate municipalities. Consequently it is frequently

alluded to as the "Greater Boston." The Greater Boston has a population which exceeds 948,000. This is 18 per cent of the population of New England—more than any New England State except Massachusetts, and more than any two of the three smaller States.

Providence is the second New England city, with a population exceeding 150,000.

Aside from the Greater Boston and Providence, no New England city, by the census of 1890, had a population exceeding 100,000. The following five cities, with a total of 374,000 persons, each had a population exceeding 50,000, but less than 100,000:

	Census of 1890.	State census of 1895.
New Haven, Conn .....	86,000	.....
Worcester, Mass .....	84,000	98,000
Lowell, Mass .....	77,000	84,000
Fall River, Mass .....	74,000	89,000
Hartford, Conn .....	53,000	.....

The following nineteen cities (total, 534,000) had a population between 20,000 and 50,000, and thirty-six others had a population of from 10,000 to 20,000 each:

	Census of 1890.	State census of 1895.		Census of 1890.	State census of 1895.
Bridgeport, Conn .....	49,000	.....	Brockton, Mass .....	27,000	38,000
Manchester, N. H .....	44,000	.....	Haverhill, Mass .....	27,000	30,000
Lawrence, Mass .....	44,000	52,000	Taunton, Mass .....	25,000	27,000
Springfield, Mass .....	44,000	51,000	Lewiston, Me .....	22,000	.....
New Bedford, Mass .....	41,000	55,000	Fitchburg, Mass .....	22,000	26,000
Portland, Me .....	36,000	.....	Woonsocket, R. I. ....	21,000	.....
Holyoke, Mass .....	35,000	40,000	Gloucester, Mass .....	21,000	28,000
Salem, Mass .....	30,000	34,000	Meriden, Conn .....	21,000	.....
Waterbury, Conn .....	28,000	.....	Lincoln, R. I .....	20,000	.....
Pawtucket, R. I .....	27,000	.....			

A study of the milk supply of these cities, therefore, is a study of the milk supply of half of the population of New England. Furthermore, a consideration of the milk supply of New England must, to a considerable extent, be devoted to the milk supply of the Greater Boston, which has 18 per cent of all the population of New England and over one-third of the city population of that section, the remainder being distributed among sixty-four places.

It is proper that Boston should receive almost a monopoly of attention for another reason than that of its relative size and commercial importance. It is about the only city in New England whose supply presents interesting and peculiar conditions.

Nearly all of the milk supply of the other cities and large towns comes from sources within a dozen miles of the point of consumption, and is largely distributed by producers from their own wagons. The ordinary milk peddler is such a familiar spectacle, so similar to every other peddler, as to make a detailed report of his work in the different

cities an uninteresting repetition of substantially the same methods, conditions, and circumstances which are already well known. On the other hand, most of the Greater Boston supply coming from more remote distances by railroads, presents conditions peculiar to itself.

## MILK SUPPLY—TRANSPORTATION, DISTRIBUTION, STATISTICS.

### BOSTON.

*Cars.*—Three-fourths of the milk supply of the Greater Boston reaches the city by railroad. The longest direct run is 140 miles, and some railroad milk comes only 20 miles. Most of this milk is conveyed in cars built for this especial purpose, with refrigerator closets for the cans of milk and with provision for steam heat. Thus refrigeration in summer and warming in winter are provided. Some of the cars have an office room provided with chairs, desk, and pigeonholes for the use of the man in charge of the car. Here he has all needed conveniences for keeping record of the milk taken at the different stations, and other necessary accounts.

These cars are leased from the railroads by wholesalers. These wholesalers furnish the carmen, ice, and other supplies; the railroad hauls the cars on passenger trains or in special milk trains, according to convenience in individual cases. Most of the cars start in the morning, from 4 to 6 o'clock, and reach the city between 10 and 11. In a few instances the car starts the afternoon previous, and is on the road over night, reaching Boston during the next forenoon. The cars, in the summer, frequently take the milk of the same morning; some start too early for the milk of that morning, especially in the winter, and hence bring the milk of the previous day. Milk is therefore eighteen to thirty hours old before reaching the city. The number of these milk cars averages about 35, although varying somewhat with the season.

*Cans.*—The milk sold in Boston is shipped in  $8\frac{1}{2}$ -quart cans, with a handle on one side and turned wooden stopples. The quart is, by statute, the wine measure quart.<sup>1</sup> No one in the trade to-day can tell why this size and shape of cans was originally adopted. The advantages claimed for them are: Convenience in handling, convenience in retailing (as many customers buy one or two cans), convenience to many small farmers who can fill only two or three cans per day, convenience in transportation (as the cans can be stacked several tiers high), cleanliness in retailing where milk is poured from the can, as it is sooner emptied than a 40-quart can, and hence the milk is exposed to the air and dirt a much less time.<sup>2</sup>

<sup>1</sup> One quart, wine measure, is  $57\frac{3}{4}$  cubic inches, or 2 pounds  $1\frac{1}{8}$  ounces of water, and 2 pounds  $2\frac{3}{8}$  ounces of milk.

<sup>2</sup> On the other hand, there are serious objections to the Boston can. Five small cans cost more than one large one and are more difficult and expensive to clean. The danger of loss and damage is increased. But the worst thing about it is the wooden stopple. Milk enters the pores of the wood and penetrates so far that no



For several years in the early history of the business there was in use a can containing  $8\frac{1}{2}$  quarts beer measure,<sup>1</sup> equal to about 10 quarts wine measure; but it gradually dropped out of use, the smaller can being more popular. The larger can is yet in use in Providence, R. I., but the  $8\frac{1}{2}$ -quart can, wine measure, is generally used throughout New England. The business was formerly done by beer measure, and these  $8\frac{1}{2}$ -quart cans, wine measure, hold 7 quarts, beer measure. The agitation for the change was partly based on the expectation that there would be more money for farmers and middlemen by getting  $8\frac{1}{2}$  quarts into a can that had formerly contained 7 quarts. But consumers were not slow to discover that they were getting a smaller quart, and the attempt failed to gain the price of  $1\frac{1}{2}$  quarts per can by the fiat that the quart should be smaller.

A carload of milk is generally considered to be 900 cans, but the peculiar shape, with flat-top wooden stopples, allows of stacking them in tiers, so that in an emergency several hundred more cans can be put into a car. By filling passageways and other open spaces as many as 1,200 cans (10,200 quarts), or over 10 tons in weight, can be got into a car. Railroad officials consider 10 tons a carload. The nominal load, however, is 900 cans (7,650 quarts).

The accompanying illustrations (Plates II, III) show the general shape of the cans and illustrate the method of handling them. These engravings present a familiar daily sight at the milk depots when the milk trains arrive.

*Historical.*—Boston seems to have been the pioneer city of the United States in the transportation of milk by railroad. The year 1830 may be taken as the commencement in the United States of the railroad system—the use of steam applied to locomotives. Soon after this we find the Boston peddlers reaching out into the country for a milk supply. Jason Chamberlain was the first man to bring milk to Boston by railroad, and the time of his beginning was April, 1838. He operated on the Boston and Worcester Railroad. He sold milk at 25 cents per can of  $9\frac{1}{2}$  quarts. Mr. Chamberlain sold his business to Rufus Whiting, who is said to have been the first to start an express business on the Boston and Worcester Railroad. He was an associate with, and sold his business to, Mr. Harnden, the now famous express promoter. This milk came by express, but in a baggage car. The first milk car was run soon after, by a company of peddlers, between Westboro and Boston. This was followed by the Boston Milk Company,

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cleaning process is efficient. Stopples split have shown penetration for half an inch, commonly, and sometimes more, and from these pieces germ cultures have been made of an extremely objectionable and offensive kind, although the stopples had been soaked, scalded, and steamed, and were supposed to be clean and harmless.

H. E. A.

<sup>1</sup> One quart, beer measure, is  $70\frac{1}{2}$  cubic inches, or 2 pounds  $8\frac{3}{4}$  ounces of water, and 2 pounds 10 ounces of milk.



FIG. 1.—MILK TRAIN AT CITY TERMINAL, BOSTON.



FIG. 2.—INTERIOR OF MILK-RECEIVING SHEDS, CITY TERMINAL.







FIG 1.—MILK DEPOT OF BOSTON CONTRACTOR.



FIG. 2.—INTERIOR OF MILK-CONTRACTOR'S DEPOT, BOSTON.



which ran a car to Cordaville, and by Rowell & Kelly, who took milk from Northboro and Fayville. In April, 1843, the New England Farmer said:

We have learned that one man brings in upon the Worcester Railroad about 200,000 gallons annually. This is supposed to be about one-tenth of all that is sold in the city. Two millions of gallons per year is the estimated amount of consumption in Boston. This, at 20 cents per gallon, costs the citizens \$400,000 per year, and, supposing the population to be 100,000, this gives to each inhabitant yearly 20 gallons, or a small fraction less than half a pint per day. The dwellers in the city of "notions" have a notion that they pay the farmers a good price for milk. Five or 6 cents per quart is usually given. This pays the farmers of the immediate vicinity as well as they get paid for most of their productions. But can those farmers live who sell milk at their doors at 10 cents per gallon in the summer and 12 cents in the winter, or at an average of 11 cents? Many such farmers there are, and some sell at lower rates than this, and yet the milk dealer gets no more than a fair compensation for his labors, expenses, and risks.

An article from the Albany Cultivator, reprinted in the New England Farmer September 6, 1843, said:

A brighter day is dawning on the dwellers in cities so far as milk is concerned, and the venders of swill slop, cold water, and artificial milks are finding their business seriously endangered. This is being brought about by the influence of railroads, which, spreading a network over the country and centering in the cities, bring the farmers and dairymen residing within 50 miles of the city within a few hours, and enable them to offer their products in the best possible condition for competition. This effect was first extensively felt in Boston in the reduction of the price and the bettering of the quality of milk, though that city had never been forced to use such scandalous stuff as was sold in other places for milk. At the present time a large portion of the milk used in that city is received by the railroads from country dairymen. The same beneficial effects are beginning to be felt in New York.

At one time two cars were loaded daily at Westboro, some farmers driving 15 miles daily to the railroad station with their supplies. Although milk consumption has increased and the milk territory has extended wonderfully since then, the shipments from this station have decreased. The growth of neighboring towns has caused more milk to be used near where it is produced.

The railroad business above noticed developed on the Boston and Worcester Railroad, entering the city on the south side. Meanwhile, however, similar enterprises had been undertaken on the north side of the city. Peddlers had gone out to Concord, Mass., and other places for milk and supplies.

T. W. Wellington, of Newton, was the first to buy milk in Wilton, N. H., for the Boston market. For about a year Mr. Wellington continued in the business, taking less than 200 gallons per day in a baggage car. Mr. Wellington sold to David L. Pierce, a retail milk dealer in Boston, who increased the business so that a special milk car was necessary. After continuing in the business for three or four years he sold to David Whiting, in the spring of 1857.

*Present wholesale methods.*—These early shipments of milk were made



by peddlers who brought into the city the milk which they needed for their retail trade. But as the business increased there happened what has taken place in every other industry—specialization. Handling milk at wholesale became a distinct business from retailing, and the men who brought in railroad milk came in time to devote the whole of their energy and capital to buying milk of the farmers, transporting it, and selling to retailers.

Various changes have taken place in the personnel of these firms of pioneer peddlers and subsequent wholesalers, but many of the names early identified with the business are still in use. Consolidations have also taken place, till to-day the business of transporting milk to the city by railroad is done by seven concerns. Six of these seven milk wholesaling houses have an association for bringing about uniformity in methods of doing business and for mutual self-protection. To-day fully three-quarters of the milk supply of the Greater Boston passes through the hands of these large wholesalers, locally known as “contractors.”

These contractors furnish the cans for the business and lease the cars of the railroads. They furnish men and supplies for the cars. In some cases they have loading platforms at shipping stations. At a number of convenient points in the country they have ice houses and cut their own supply of ice. In the city they have platforms, storehouses, refrigerators, offices, etc., near the railroad tracks; and their cars on reaching the city are switched onto the side tracks at their business depots. The loading and unloading is done by the contractors.

All of the contractors have cheese or butter factories in the city or country, or both, for the manufacture of butter and cheese.

The milk is bought in the country at a price for the milk delivered at the car at the different country railroad stations. In some instances each farmer carries his milk to the railroad station; in others the farmers in one neighborhood or in one locality cooperate in an arrangement with one of their number to do the teaming; in yet other instances the contractors employ someone to haul milk from the farmers' doors to the railroad station, and deduct the expense from the amount due the farmers for milk. Milk is frequently drawn 6 miles to a railroad station; and in some cases as far as 10 to 15 miles.

*The wholesalers or contractors.*—The various companies and individuals above alluded to as carrying milk on the Boston and Worcester Railroad, on the south side of the city, consolidated into the firm of C. Brigham & Co. to do a strictly wholesale business. This company later became incorporated as The C. Brigham Company, and is yet in the business.

Mr. David Whiting, who bought the business of Mr. Wellington, as noticed above, was a large and successful farmer. Although driven into the business to protect his interests, the traits of character which brought success in other enterprises made him successful as a milk wholesaler. In 1865 he associated with him his sons, George O. and

Harvey A., under the firm name of D. Whiting & Sons. The business is continued to-day under the same name, two of Mr. Whiting's grandsons being among the executive officers.

Mr. H. P. Hood began in the milk business in Boston, as a peddler, in 1846. For nine years he bought milk of contractors, but in 1855 he began running a car on his own account from Derry, N. H., to which place he moved. He has been in the wholesale milk business ever since, and has increased the business from one to eight cars. His sons are now associated with him in the management of the business.

The Boston Dairy Company is the newest of the larger companies; it is the consolidation of several interests, and is a continuation of the long-established business of Tower & Whitcomb. Mr. W. A. Graustein is the executive head.

The Elm Farm Company was started by a wealthy farmer-manufacturer, Mr. Ray, of Franklin, Mass., as a means of marketing his own milk independent of the regular contractors; but he soon commenced buying milk of his farmer neighbors, and the business extended until the company confined itself to a wholesale business.

Mr. J. F. French brings one carload per day into the city, and has done so for several years.

These are the component elements of the contractors' association.

In addition, one car of milk per day is brought into the city by the Deerfoot Farm Company of Southboro, Mass., much of which is sold direct by themselves to the consumers. The Deerfoot Farm Company was started by Hon. Edward Burnett to furnish high-grade Jersey milk to patrons able and willing to pay a corresponding price, but latterly the business has increased so as to include, in addition to the above, a general wholesale trade. Mr. Robert Burnett is the executive manager.

Mr. George O. Whiting, the executive head of D. Whiting & Sons, owns a controlling interest in the C. Brigham Company and in the Elm Farm Company. He is a man of much executive energy, and is known as "the milk king of New England."

*Statistics.*—The members of the Milk Contractors' Association report monthly to each other their receipts and sales, and have done so for years, so that much valuable information has accumulated in connection with the business. These figures are not absolutely infallible for purposes of comparison, because the association has occasionally taken in new members, whose receipts and sales are then added to those of the others. But those persons to whom such statistics are serviceable can make some allowance for this and find much value in the figures.

We give below some recent tables on this subject, the figures representing the number of 8½-quart cans:

Year.	Receipts.	Sales.	Surplus.
1892 .....	9, 212, 667	7, 315, 135	.....
1893 .....	9, 263, 487	7, 619, 722	1, 643, 765
1894 .....	9, 705, 447	7, 657, 421	2, 048, 026
1895 .....	9, 856, 500	8, 040, 732	1, 815, 768
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1896.			
January.....	844, 709	651, 827	192, 882
February.....	808, 383	611, 793	196, 590
March.....	871, 572	657, 039	214, 534
April.....	891, 275	672, 561	218, 714
May.....	1, 005, 115	696, 599	308, 516
June.....	994, 817	675, 796	319, 021
July.....	899, 397	712, 188	187, 209
August.....	854, 913	687, 224	167, 689
September.....	866, 691	635, 092	231, 599
October.....	960, 734	699, 245	261, 489
November.....	885, 903	690, 920	194, 983
December.....	898, 599	707, 095	191, 504
Total.....	10, 782, 108	8, 097, 379	2, 684, 730
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1897.			
January.....	923, 852	705, 324	218, 528
February.....	835, 115	639, 952	195, 163
March.....	960, 084	719, 814	240, 270
April.....	976, 996	733, 298	243, 698
May.....	1, 105, 325	759, 875	345, 450
June.....	1, 115, 234	752, 038	363, 196
July.....	1, 013, 552	789, 849	223, 703
August.....	966, 058	720, 374	245, 684
September.....	956, 445	732, 795	223, 650
October.....	1, 037, 764	751, 944	285, 820
November.....	962, 552	708, 459	254, 093
December.....	945, 254	724, 850	220, 364
Total .....	11, 798, 231	8, 738, 572	3, 059, 619

*Milk Producers' Union.*—Before going on to speak further about the prices of milk and some of the detailed methods of handling it which are peculiar to Boston, a word should be spoken about the Milk Producers' Union. This is an organization of the farmers who sell milk to the contractors. The farmers of the several shipping towns form a local organization and send delegates to an annual meeting of the central union, which elects executive officers and transacts other necessary business. The organization has been in existence in one form or another since 1886. The work of the union, which has been supplemented by that of the association of wholesalers, who regulate the business from their end, has been to promote uniformity and business-like methods. The tabulation and publication of the above statistics were brought about through the combined efforts of the Milk Producers' Union and the Milk Contractors' Association. The prices of milk are usually arranged by mutual agreement between the contractors and the officers of the Milk Producers' Union. Blanks are sent semi-annually to the producers belonging to the union, on which they express their opinion as to the price of milk and state the number of cans shipped. These replies are averaged on the basis of cans rather



than individuals; and the negotiations between the contractors and the union are based upon this expression of opinion.

The union has the machinery in its constitution for ordering a strike, so to speak, in case of an emergency. Two or three times in the history of the union a rupture of this kind has seemed imminent, but it has been averted for the best interests of all, usually by mutual concessions, so that the farmers have gained directly by having an organization. They also feel that they have gained some unfought battles, and believe that they have generally been treated better by the contractors, by reason of having an association, than they would have been if the contractors were dealing with individuals, or simply issued an ultimatum of what they would pay for milk without their authority being questioned. At times some farmers have been dissatisfied with the work of the union because it was not more radical and sweeping, but in the main the more conservative farmers feel that it has been of great service to them. The existence of such an organization has tended to promote uniformity in prices, and there has been little variation in prices for a number of years.

*Prices paid.*—As milk is shipped from stations of varying distances from the city, the following arrangement has been made as a convenient method for determining a price for each station. It has been agreed between the contractors and the Milk Producers' Union that all negotiations should be for a theoretical Boston price per can, and that there should be the following discounts from that price:

	Cents.
For stations between 17 and 23 miles from Boston.....	8
For stations between 23 and 36 miles from Boston.....	9
For stations between 36 and 56 miles from Boston.....	10
For stations between 56 and 76 miles from Boston.....	11
And 1 cent more for each additional 20 miles.	

The price is adjusted twice a year for the six months beginning April 1 and October 1. The theoretical Boston price per can of  $8\frac{1}{2}$  quarts for a number of years has been as follows:

Year.	Summer.	Winter.	Year.	Summer.	Winter.
	Cents.	Cents.		Cents.	Cents.
1886 .....	30	36	1893 .....	33	37
1887 .....	30	36	1894 .....	33	37
1888 .....	32	38	1895 .....	33	37
1889 .....	32	38	1896 .....	33	35
1890 .....	32	36	1897 .....	33	35
1891 .....	33	37			
1892 .....	33	37	Average (12 years) ....	32 $\frac{1}{4}$	36 $\frac{3}{4}$

In 1874-75 the winter price per can was 40 cents, the summer price 32 cents; difference, 8 cents. For several of the years included in the above table there was a difference of 6 cents between the summer and the winter prices. In 1890 and 1891 the summer price advanced and the winter price declined, and for four years thereafter there was a difference of 4 cents per can between summer and winter milk. In Octo-

ber, 1896, the winter price was cut again, leaving the difference only 2 cents. The increasing attention given to winter dairying has brought the supply of winter milk nearer to that of summer milk, and made advisable, so the contractors claim, less disparity in price.

The increase of winter dairying has been caused not only by the increased profit in winter milk, but to a certain extent, in market gardening sections, by the desire of farmers who produce milk to carry more cows in the winter in order to get manure for their garden crops.

Payments to the farmers for milk sold to the contractors are made monthly, as soon after the 1st of the month as the clerical work of closing the accounts and drawing checks can be done.

According to the agreement alluded to, the payment per can of milk which the farmer would receive at his railroad station would be the theoretical Boston price less 8, 9, 10, or 11 cents, depending upon his distance from the city. The amount of milk handled by the contractors is so large that these prices govern to a considerable extent the dealings of many milkmen in other places.

When this arrangement was first considered, it was expected that the theoretical Boston price would be the figure at which milk would be sold to the peddlers, and that the discount would therefore represent cost of transportation, cost of doing the business, losses from bad bills, and profits; but competition of one kind and another has reduced the price to the peddlers so that they now pay 3 and 4 cents less than the nominal Boston price, and it has become wholly a theoretical figure, used and useful only as a number from which to subtract the various discounts depending upon distance of transportation. The expenses of doing the business and the profits to the contractors are therefore from 4 to 7 cents per can.

Milk was sold by the contractors to peddlers during the summer of 1897 at 30 cents per can, with rumors of cutting prices to 29 and even 28 cents. Milk is sold by the peddlers at varying prices. Hotels and large restaurants buy close and allow only 2 or 3 cents for handling; they bought during 1897 at 32 to 35 cents per can. Small stores, which retail by the quart the contents of only a few cans, pay 38 to 40 cents per can. Consumers of a can daily pay 45 and 50 cents, and those who have a quart of milk delivered at their houses daily by the milkman pay 7 cents per quart. Sometimes pint customers pay at the rate of 8 cents per quart. By going to the store for it, consumers frequently buy as low as 6 cents, and in some instances for 5. Milk in a few cases seems to be selected by grocers and provision dealers as an article to sell at cost or a little less as a bid for other business.

*Grading the price.*—One of the peculiarities of the way in which the Boston milk business is carried on by the contractors is what is called "grading the price." To illustrate: The contractors agree to pay at stations situated a certain distance from Boston 24 cents per can for the summer—that is, from April to October. But they do not pay 24

cents for each and every month; instead of that, they pay a price which will average 24 cents. During the flush months of May and June the price may be perhaps 22 cents, and to offset that cut the price will be increased to 26 cents during the sultry months of August and September, when milk is sometimes scarce. This "grading" has a tendency to discourage exceptionally large shipments during months when the supply would naturally be the largest. It also stimulates production during the months when the supply might otherwise be short. When the price has been agreed upon, the contractors send to each station a card similar to the following:

(For railroad stations in the towns of Chelmsford and Sudbury, summer of 1897.)

The graded price of milk per can of eight and one-half quarts, delivered in good order, with dairy number plainly marked on stopper with stickers, and up to the standard required by law, in the car, for the following six months, from April 1, 1897, will be:

	Cents.		Cents.
April .....	24	July .....	24
May .....	22	August .....	26
June .....	22	September .....	26
Average, 24 cents.			

In case the amount of milk received by the contractors and not sold for use as milk shall exceed 5 per cent of the entire sales of the month, then for said excess over and above the 5 per cent the contractors shall pay only what said excess is worth for butter, taking the average price of butter for the month; and the value of the surplus milk, manufactured into butter, shall be determined by a committee of farmers and contractors.

#### MILK CANS.

Milk cans are the property of the persons or company whose name is stamped upon them. The ownership is absolute. The legislature has passed a law which makes it a criminal offense, punishable by fine and imprisonment, to retain or make use of a milk can for any purpose whatever without the consent of the contractor or owner. (See chapter 440, Acts of 1893.)

*Contractors' surplus milk.*—As stated above, the contractors and the Producers' Union agree upon a price for six months in advance. In doing this the purchasing contractors seem to be taking some chances, for they can not foresee the demand. Particularly is this the case in the summer, for then the demand depends much on the weather, as a hot, sultry "spell" causes the consumption of milk to increase rapidly. Further than this, the contractors appear to take large chances in another way. They agree to take all the milk that the farmers supplying them with milk at the various shipping stations may produce. This leads to receipts largely in excess of the demand, as has been seen by the preceding tables of receipts and sales; the excess sometimes reaches one-fourth of the receipts. The contractors save themselves from loss by an arrangement by which the stipulated price is paid for only such milk as is sold again and for a small margin in excess (equal to 5 per cent of the sales; see above card). All surplus beyond this is made into butter by the contractors, at their creameries, on the farmers'

account, allowing each month, as the value of the butter, the average of the jobbing price of butter quoted by the chamber of commerce during the month and charging 4 cents per pound for making. Thus the farmer is sure of getting at least butter value for all the milk he can make. To protect the farmers from an undue extension of this surplus privilege, the contractors agree not to extend their routes or enlarge their territory. The advantages of this surplus system are:

(1) The market is more steady than it would otherwise be. The figures above show that the price has been very uniform for many years. The surplus, being in the hands of the large dealers, does not get upon the market, and the supply offered to the retail trade by the contractors is never in excess of the demand.

(2) The contractors have a large reservoir to draw from when sultry summer weather or other cause increases the demand; hence the market is never short of milk.

(3) The farmers find a market for more milk than they otherwise would, though the surplus portion is sold at much less than the other part. The butter value of the surplus milk for the year 1896, less the cost of making, was 13 cents per can, a fraction over 71 cents per hundred pounds. For 1897 the butter value of a can of milk averaged  $13\frac{1}{3}$  cents, a little better than for 1896.

The disadvantage of the system is that it is the cause of much friction between the producers and the contractors. The surplus offers a good opportunity to increase the farmers' natural suspicion of the contractors. The application of the system is blind to many farmers, some of whom even question the honesty of the contractors in accounting for the amount of the surplus. This difference is further intensified by the method of settling with the farmers. The contractors, for their convenience, ascertain how much of a discount the butter value of the surplus would create on the whole amount of milk which a farmer ships, and in making their payment they deduct this amount from what would be due if all milk shipped had been sold at the long price. Hence the monthly bills are not written for the proportionate amount of sale milk at, for instance, 20 cents, plus the proportionate amount of surplus milk at, for instance, 13 cents; but, it having been found that the amount of surplus milk and its butter value is enough to reduce the average price of milk at a 20-cent station  $1\frac{1}{2}$  cents, when the farmer makes out his bill for his full shipment at 20 cents per can the contractors discount the bill  $1\frac{1}{2}$  cents per can and remit the balance.

The surplus for May, 1897—the butter value of milk being 11 cents per can—amounted to an average discount per can on all shipments as follows:

	Cents.
Where price was 19 cents. ....	2.26
Where price was 20 cents. ....	2.54
Where price was 21 cents. ....	2.82
Where price was 22 cents. ....	3.11
Where price was 23 cents. ....	3.39



In this way the contractors' clerks can figure the accounts quite rapidly; but the method increases the dissatisfaction with the system, because to the mind of the farmer the butter value of surplus milk creates an actual discount or a "charge back" on the whole of his bill.

This system of buying all the milk that is offered furnishes shippers a market for all they can produce, but this in turn tends to increase the surplus, which reached unusual proportions during the years 1896 and 1897. This, coupled with the low price of butter, made the discount for those years more than twice what it had previously been. The records of milk meetings and farmers' gatherings show that the surplus is the great cause of dissatisfaction, the burden of many resolutions and speeches being that the contractors should buy "straight." The contractors have sometimes agreed to take all chances of surplus and pay a straight price if they could buy for 2 cents less. Before this system was introduced there was much complaint at the irregularity of the amount sold to the contractors. If the supply ran ahead of the demand, the farmers would receive notice to keep back part of their supplies; and they were liable to be obliged to make butter or cheese in varying quantities every few days. This was a great inconvenience and caused much grumbling, which was remedied by the contractors adopting the present plan, taking all produced and paying butter price for the surplus. But that was so many years ago that the improvement is not generally remembered. The feeling against the surplus was so strong in 1889 that the matter was referred to the State board of arbitration, which decided that the principle was a sound one.

It should be stated here that the different wholesale firms report their receipts, sales, and surplus to their organization and to the Milk-Producers' Union, and the discount is figured on the totals, being the same to all farmers at equal distances from the city, regardless of the contractors to whom they sell or the amount of surplus which their individual wholesaler may have had.

*Retailing.*—On the arrival of the milk cars in Boston they are run onto the railroad sidings of the milk contractors from 9 to 11 o'clock a. m., regardless of the distance the cars have come. The peddlers by this time have finished their morning's distribution of milk and their wagons are backed to the contractors' platforms and sheds for the next day's supply. The cans are quickly transferred from the cars to the peddlers' wagons. In a few cases, where there are customers for several cans, a delivery is made at once, but most of this milk is carried to the different peddlers' headquarters. Here the milk is run through a large mixer, so as to insure uniform quality. Then it is drawn off into quart and pint cans, of tin, and placed on ice. The next morning about 2 o'clock the peddler starts out to deliver this milk to the customer, leaving at the door of tenement, flat, and dwelling house the can of milk, usually before the family is out of bed. By this it will be seen that the milk is in the city about eighteen hours before reaching the consumer.

It will also be noticed that the milk is delivered in individual cans, never poured or dipped from the large can to the consumer's dish. According to the milk inspector of the municipality of Boston, the number of persons selling milk from wagons during 1896 was 598, and the number of shopkeepers who sold milk was 1,019. In Cambridge there were 189 peddlers and 111 store milk dealers. The numbers remained practically the same in 1897. Nearly all of the peddlers use wagons of the same style—the body like an express wagon, with a rounded canopy top, open at the front and rear.

*Clean cans.*—When the retailers go to the wholesalers' depots for their daily supplies they usually take with them return cans, belonging to the wholesalers, in which they have taken their supplies on a previous day. These cans are immediately rushed on board the cars, so that the latter may be ready with as little delay as possible to be drawn out and made up in the trains for returning. On account of this procedure the cans are returned to the farmers unwashed, and sometimes in a very filthy condition, for a can may have been delivered by the peddler to a grocer where a portion of the contents which was unsold has soured and stuck to the bottom and sides of the can before the peddler calls for it to return to the wholesaler; in exceptional cases the can may have been used for other articles, possibly kerosene oil. The farmers have frequently consulted together as to the best means of bringing some pressure to bear on the contractors to compel them to return clean cans. This feeling has gone so far as to result in several attempts to induce the legislature to pass compulsory laws on the subject.

The contractors make two excuses for this way of doing business. The first is the matter of expense; they claim that to have the cans washed before returning would mean the impossibility of getting them onto the car that day, and the necessity of having a large investment of money tied up in a triplicate set of cans. The second excuse is that even if they washed the cans, after having been tightly bunged up in the car and on the road for several hours, they would be unfit for use in reshipping milk without being scalded. The contractors claim that if the cans are sent into the country clean many farmers will neglect this precaution, and that the next day's milk would reach the city in worse condition than when the cans are carefully cleaned, scalded, and aired at the dairy before putting fresh milk into them.

*Methods of producers and shippers.*—The methods pursued by the milk-producing farmers who supply the contractors may be described more in detail, as follows:

For example, a neighborhood may be taken in Windsor or Windham County, Vt., from which the milk is hauled by wagon to Bellows Falls and there put on the milk car.

The process by which the milk is prepared for marketing is simple, though it requires care and attention to preserve an equal temperature.

The morning's milk is cooled by various methods, some employing ice, while not a few suspend the cans in a well. When the night's milk has been cooled, a wood stopper is placed in the full can, upon which is pasted a small adhesive stamp a trifle smaller than a postage stamp, and on this is printed the number of the dairy, as well as the number of the car conveying the milk from Bellows Falls to Boston.

As a rule neighboring dairymen have an arrangement by which one of their number takes the daily product to the main highway, where the cans are picked up every night by the milk wagon and the "empties" returned by the same conveyance in the morning. In some cases, however, the farmer lives 3 or 4 miles off the route, and of course is obliged to bring his own milk.

One route starts from Chester, Windsor County, the distance from the driver's house to Bellows Falls being 16 miles. This driver receives 3 cents per can of  $8\frac{1}{2}$  quarts (or  $18\frac{1}{4}$  pounds) for carting, and this is, of course, paid by the farmer. With a four-horse covered wagon, this collector starts from his home every night in the week at 9 o'clock, going by the most direct road to Rockingham, thence to Bellows Falls. At present this route furnishes 180 cans, which are picked up in different places along the highway to Bartonville. It takes about six hours to make the trip, which could be done in considerably less time but for the work of picking up the cans. The route is not particularly pleasant by night, and especially is this true in stormy weather, yet for the 365 nights in the year this driver faithfully performs his duty, whether in storm or starlight. The trip is not infrequently attended with disagreeable and even dangerous features, as was the case during the floods of 1897, when the highway was washed out in several places, necessitating a roundabout trip of several miles through Saxtons River. But the milk was delivered every morning at the car before the time of leaving Bellows Falls for Boston.

On arriving at the car the milk is weighed by those in charge and the weights credited to the numbers representing the respective dairymen. The milk car starts daily at 5.30 a. m. and reaches Boston about four hours later, and twenty-eight or twenty-nine hours after the morning milking of the day before. Since the establishment of this route, in the year 1890, the business gradually increased until June, 1897, when the shipments amounted to nearly 700 cans a day.

*Boston system summed up.*—The advantage of this system of handling milk by large wholesalers, combined into an association, is that the business is in the hands of solvent parties, who can be relied upon to pay the farmers promptly the money due them; the business is done in a uniform, methodical way, all producers being treated alike; there is more publicity to the business than there would be if the milk were sold to a great many small, isolated peddlers. The existing Boston system maintains a more steady market than would otherwise be possible, by keeping off from it an undue surplus which would break the



price; consequently this arrangement insures better prices to farmers than they would otherwise get. Another advantage is in the fact that this large combination of wholesalers doing business in a systematic way, with regular chemists, etc., is a powerful factor in elevating the quality of milk on the market and helping to bring it up to a satisfactory standard. With good laws to start with, to which reference will be made further on, and a strong financial interest working to sustain these laws, a great deal is done for the quality of milk.

There are disadvantages connected with the Boston system, some of which have been sufficiently described. Another is that it does not stimulate any advance in quality of milk beyond meeting the standard required by law.

*Other milk supply.*—It has already been stated that the milk brought into the city by the contractors is about three-quarters of the whole supply. A portion of the other one-fourth comes in by railroad, brought by peddlers who go into the country and buy direct from the farmers. These peddlers usually buy on the basis of the contractors' prices, for these prices set the pace for about all of the milk business, and, to a large extent, govern it. But these peddlers buy only what their ordinary trade will take. If they occasionally need extra milk they can buy it of the contractors. Though these peddlers pay no more than the regular price, the farmer gets the full price for all that he sells, because the peddler whom he supplies never has a surplus for which to pay a lower price. On the other hand, the more of such business there is the more the surplus tends to increase in the hands of the contractors. Their burdensome surplus is a convenience in a pinch to the outside peddler, who competes with them for milk and for customers, but who carries none of the inconvenience of a surplus.

Another portion of the milk of the Greater Boston is produced within its limits. This is not much of a factor in the city proper, but the geographical and business reasons which lead to the grouping of several municipalities as the Greater Boston necessarily include a few places which produce nearly all of their local milk supply. In one or two instances—Milton especially—the place supplies milk to some of its neighbors. Over 7,000 cows are kept in the Greater Boston, located as follows:

Boston .....	850	Malden .....	169
Chelsea .....	87	Medford .....	282
Revere .....	168	Melrose .....	214
Winthrop .....	83	Newton .....	1,212
Quincy .....	656	Somerville .....	314
Milton .....	804	Stoneham .....	311
Winchester .....	240	Arlington .....	236
Woburn .....	362	Belmont .....	173
Watertown .....	281	Saugus .....	544
Waltham .....	882	Lynn .....	342

A third source of supply of outside milk is from territory contiguous to the Greater Boston, which can be reached by a drive of 10 to 15



miles. This region is quite thickly settled, and consumes considerable milk, yet it also produces much milk to sell in Boston, which is brought in by wagons. The inspector of the city of Boston reports 5,232 cans sold daily in his jurisdiction, aside from the railroad milk. The milk in other cities and towns of the Greater Boston not brought by rail must be 5,000 cans more. Two of the largest towns for milk shipments by team are Dedham and Bedford, from each of which nearly 1,000 cans are daily hauled.

This nearby milk, although only about one-fourth of the city supply, has shown a tendency to increase of late; its competition with railroad milk was unusually severe during the last few months of 1897. This has been because milk has been maintained at such an even price, because there has been an unusual disparity between the sale-milk value and the butter value of the product, and because prices of other farm products were so depressed that milk was relatively the most profitable farm product, in very many cases.

#### PROVIDENCE.

Providence, the second in size of the New England cities, has an estimated population of 150,000. The best estimates obtainable place the milk consumption at 75,000 quarts per day. This amounts to 27,375,000 quarts per year. This milk is sold from 407 peddlers' wagons and 900 stores, restaurants, bakeries, etc. Nearly all of the milk is produced within 20 miles of the city. Most of the milk that is brought in wagons comes an average distance of 12 miles, though a little comes 20 miles each day. The balance is carried by railroad. One car brings in 9,500 quarts per day. This car starts from Willimantic, Conn., a distance of 60 miles. About 4,000 quarts per day are carried on the other railroads in express and baggage cars. The milk is shipped, for the most part, in cans similar in general style to the Boston milk can, but containing  $9\frac{1}{2}$  and  $10\frac{1}{2}$  quarts.

The selling of milk from stores is more prevalent than in many other cities of New England. It is estimated that almost half of the milk consumed in this city is sold from stores instead of being delivered from house to house by peddlers. Most of the railroad milk goes directly to stores.

The price of milk for the last few years has been quite uniform, consumers paying usually a cent less in the summer than in the winter. The retail summer price ranges from 5 to 7 cents and the winter price from 6 to 8 cents. The wholesale price per can in the summer is at the rate of 15 or 16 cents per gallon, and 19 or 20 cents per gallon in the winter. About one-third of the nearby milk is sold by the producers themselves, who drive into the city every morning with their supplies, retailing from house to house. About two thirds of the nearby milk is sold by peddlers who buy milk from the farmers. Some of them buy from middlemen, who pick up milk from the farmers and haul it to the city. In these cases the peddlers do not see or know the men who

produce the milk for them. These middlemen, however, differ from those in Boston in that they occupy a much less conspicuous place in the business than the Boston contractors and are hardly more than agents and teamsters for the city peddlers.

The producers receive 11 to 12 cents per gallon for milk in the summer, and 15 or 16 cents in the winter.

The population of Providence has increased from 120,000, in 1886, to 150,000 in 1896, or 25 per cent; but the consumption of milk appears to have increased about 122 per cent, only 33,700 quarts per day being reported in 1886. These figures show that there has been greatly increased consumption of milk per capita during the last few years.

Milk is from twelve to forty-eight hours old when it reaches the consumers in Providence.

#### OTHER CITIES.

The reports from the other New England cities are, for the most part, without novel features. To go into the details about each city would be mere repetition, to a large extent. The milk generally is brought into the city early in the morning by retailers who are, for the most part, producers. In some instances peddlers buy the supplies of farmers and act only as middlemen. In other cases the farmer supplements his own supply by buying from his neighbors. The milk is mostly produced within a dozen or fifteen miles of the city where it is consumed. The night's milk is not over 12 hours old when it reaches the consumers; the morning's milk not over 6. Consequently less pains are taken in cooling and caring for the milk than when it becomes 48 to 72 hours old before reaching the consumer. Six cents per quart is the average price to consumers. In some cities the price drops to 5 cents in the summer, and in a few instances 7 cents is reached in the winter.

The usual method of distributing milk is by pouring from the 8½-quart cans into the individual cans, pitchers, or bowls of customers at their doors, although some peddlers carry individual cans. The use of glass bottles is comparatively rare, though increasing. In many cities the old-fashioned wagons are giving way to vehicles built low-down expressly for the milk business. In many cases farmers who sell milk pay some attention to vegetables and small fruits, which utilizes help, insures an advantageous rotation of tillage, helps out the supply of manure, and assures a retail market for eggs, fruit, or vegetables.

Worcester, Mass., has a population of 110,000 at present, and annually consumes 2,076,000 cans, which is sold from 650 wagons and stores. It is retailed for the most part at 6 cents per quart, summer and winter. In the city and suburbs are a number of superior Jersey and Guernsey herds, for whose milk better prices are obtained. Worcester has a very efficient milk dealers and producers' association, which does much to promote uniformity in price and to keep up the quality. Many of the Worcester milkmen are market gardeners, who combine the two kinds of farming to advantage.

Most of the Lowell, Mass., daily supply of 3,511 cans comes directly from the farmers within a few miles of the city. But a Boston milk train passes through the city, and at times a little railroad milk is left. Milk retails for the most part for 5 cents per quart in the summer and 6 cents in the winter. One hundred and seventy-six milk dealers' licenses are issued in this city. The population is 84,000.

Burlington, Vt., uses about 365,000 gallons annually, which is sold by about 140 peddlers, many of whom are producers. The population in 1890 was 15,000, but it is estimated now at about 20,000. The per capita consumption of milk has increased materially during the past ten years. The trade has nearly doubled, while the increase in population is about one-third. Prices at retail range from 4 to 6 cents in the summer, and from 5 to 7 cents in the winter.

Augusta, Me., with a population of 12,000, uses 1,600 to 2,000 quarts of milk daily, mostly retailed at a uniform price of 6 cents the year around. The farmers who produce the milk for the most part retail it.

Portland, Me., uses the milk of about 4,000 cows, which amounts to about 2,250,000 gallons a year. Some of this milk is sent in by railroad in baggage and express cars. This is retailed by peddlers, who are mostly middlemen. The milkmen supplying the Portland market have an organization.

New Bedford, Mass., has 151 licensed dealers retailing 24,000 or 25,000 quarts per day; the retail prices are mostly 6 and 7 cents. Producers largely retail their own supplies.

Taunton, Mass., has 24 licensed dealers and uses about 12,000 quarts per day. The retail price is 6 cents summer and winter.

Hartford, Conn., licenses 152 regular retail dealers. An average of 26,000 quarts is sold daily. All is produced within 10 miles of the city.

#### THE CREAM TRADE.

The cream trade has increased rapidly in Boston, Providence, and other cities during the past few years. Formerly there was a small supply and limited demand. The business was not pushed. A person who wanted cream could in most cases be supplied by his milkman, and the large Boston contractors did quite a cream trade. Still, cream was generally looked upon as a special luxury. The increasing use of the separator helped to develop the business, making it more easy than ever before to secure sweet cream of good keeping qualities.

The great increase in the cream business, however, has been due to the systematic business-like push and enterprise of a few Maine creameries. This business began in the latter part of the eighties. The cream is sent in 6-gallon cans, packed in ice, by express on fast trains, reaching Boston about 6 o'clock in the morning. It is there received by agents of the proprietors, put into half pint, pint, and quart glass jars, and delivered at once. It is not only delivered direct to families, but is a common and staple article of merchandise in the grocery stores in

Boston, Providence, and other portions of southeastern New England. Many stores which took experimentally only one or two cans to begin with, found their trade rapidly increased, as the public quickly "caught on" to the possibility of getting cream of reliable quality and good condition for keeping.

This cream is of uniform quality, heavy and rich, being about 45 per cent butter fat, is put up in attractive and convenient form, and keeps well. This has stimulated a growing demand.

Such signs as "Bangor cream," "Hampden cream," "Wallingford cream," are now a frequent and familiar sight in a majority of grocery and provision stores. The cream is retailed in Boston at 60 cents per quart.

One establishment shipping cream from Maine makes the following report of its business for the last three years, showing the increase in the use of cream. The figures are for gallons:

*Thick cream, 47 per cent butter fat.*

	1894.	1895.	1896.	First six months of 1897.
Boston and vicinity .....	33,466	40,141	43,542	28,034
Beverly, Lynn, and Salem .....	8,033	8,811	9,432	4,333
Places outside of Massachusetts .....	1,531	1,476	1,502	1,564
Total .....	43,030	50,428	54,476	33,931

*Thin cream, 18 per cent butter fat.*

	1894.	1895.	1896.	First six months of 1897.
Boston and vicinity .....	667	6,645	12,618	4,925
Lynn, Salem, and Beverly .....		702	1,969	914
Total .....	667	7,347	14,587	5,839

Other Maine creameries are also making large shipments. Faster railroad trains are said to be necessary to still further develop this cream trade. The creameries are mostly proprietary, buying milk of the farmers. As a rule there are no particular feeding materials to which objections are raised to the farmers using, but much pains are taken to impress the great importance of cleanliness in every detail of the business.

SKIM MILK.

The skim milk problem is of considerable importance in the city of Boston. As we have shown above, a great deal of the surplus milk is made into butter after it reaches the city. Consequently, there is a supply of skim milk more than usual in such a center. A great deal of this is allowed to run into the sewers, as there is no market for it; some is sold, and some is returned to the farmers, but the greater part is



thrown away. This is a great loss of food material, and if the people of the city could realize the food value of skim milk, and could buy it at a reasonable price, much good would result. But as ordinarily sold, a quart of skim milk too often replaces a quart of whole milk, and thus to that extent injures the sale of whole milk. Further than that, skim milk is to quite an extent used to adulterate whole milk; just how much no one can say. When milk is adulterated with water, the amount of solids not fat is reduced in the same proportion as the fat, and the abnormally low amount of solids not fat is evidence of the work of adulteration. But when the adulterant used is skim milk, the solids not fat remain the normal amount; consequently, the adulteration is more difficult to detect; hence, more dangerous.

In the other cities there is something of a sale of skim milk, but it is much less, that in Lowell, for instance, amounting to 2,227 quarts per day. The most of this skim milk sold out of Boston is sold honestly as a valuable food product.

The use of buttermilk is not so extensive as it ought to be, and yet in some cities considerable goes into consumption. In Lowell something like 850 quarts per day are sold. In Worcester the product of one or two creameries is retailed each day. But speaking in a general way, the sale of buttermilk is quite small.

#### CONDENSED MILK.

The use of condensed milk is increasing, especially in Boston. A large city collects many people who are compelled to keep house in restricted quarters; in not a few instances shop and office girls practice light housekeeping in a single room. In these and other cases the can of condensed milk is a convenient article. New England has six condensed-milk factories, and the product from the West and even from abroad is also sold in the grocery and provision stores.

#### MILK CONSUMPTION PER CAPITA.

The consumption of milk per capita is a very difficult thing to get at, and statistics on this point must necessarily be more or less faulty. An effort has been made to gain information on this subject and a careful investigation of the quantity of milk sold in a number of cities has been made, and the amount ascertained has been divided by the population. The result is remarkably uniform, as follows (the figures indicate hundredths of a quart used daily per capita of population):

Boston .....	.48	Haverhill .....	.45	Nashua .....	.41
Lowell .....	.33	Burlington .....	.50	Lawrence .....	.40
Hartford .....	.47	Worcester .....	.44	Pittsfield .....	.30
Nashua .....	.42				

In all of these cases it must be remembered that an element of uncertainty exists in the degree of accuracy in the reports of the amount of milk sold with which we have been furnished, but the results are so

uniform that it is hardly fair to suppose that an equal error could have been made in every case. Therefore it seems reasonable to assume, in a general way, that the consumption of milk in Massachusetts cities is a little less than a pint per person per day—a little over four-tenths of a quart. In no case does this include the sales of skim milk, condensed milk, or cream.

## MILK LAWS AND INSPECTION.

### LEGAL STANDARD AND ADULTERATION.

All of the New England States have laws prohibiting the sale of adulterated or watered milk, or milk from which a portion of the cream has been removed. All of the States except Connecticut have a statute standard for milk.

Massachusetts prohibits the sale of milk "not of standard quality," as well as of adulterated milk, and the following statute defines standard milk:

If the milk is shown upon analysis to contain less than thirteen per cent of milk solids, or to contain less than nine and three-tenths per cent of milk solids exclusive of fat, it shall be deemed for the purposes of this act to be not of good standard quality, except during the months of April, May, June, July, and August, when milk containing less than twelve per cent of milk solids, or less than nine per cent of milk solids exclusive of fat, or less than three per cent of fat, shall be deemed to be not of good standard quality.

Nearly all of the cases entered in court for the violation of these milk laws complain of the offender for selling, or having in his possession or custody with intent to sell, "milk not of standard quality," instead of "adulterated or watered milk."

The Rhode Island law provides that—

If the milk shall be shown upon analysis to contain more than eighty-eight per centum of watery fluids, or to contain less than twelve per centum of milk solids, or less than two and one-half per centum of milk fats, it shall be deemed for the purpose of said sections to be adulterated.

The New Hampshire law says that if milk has less than 13 per cent of milk solids said fact "shall be prima facie evidence" that the milk is adulterated. But evidence that milk has less than 13 per cent solids is frequently rebutted by producing or offering to produce some cow which gives milk of less than 13 per cent solids, and therefore the whole law is nullified.

In Maine, "when milk shall be found to contain over 88 per cent of water it shall be deemed prima facie evidence that said milk has been watered, and when milk by the analysis aforesaid shall be found to contain less than 12 per cent of solids and less than 3 per cent of fat it shall be deemed, prima facie, milk from which cream has been taken." This is similar to the New Hampshire law, but we have heard no complaints from Maine over the words "prima facie."

Vermont, like Massachusetts, prohibits the sale of milk "not of good standard quality," as well as adulterated milk, milk from which a por-

tion of the cream has been removed, etc. The Vermont statute defines standard milk as follows:

Standard milk shall contain not less than twelve and one-half per cent of solids, or not less than nine and one-fourth of total solids exclusive of fat, except in the months of May and June, when it shall contain not less than twelve per cent of total solids.

The laws of the several States also have regulations for promoting honesty in sales of skim milk, such as labeling cans, etc.

Wine measure is by law the standard measure.

#### OFFICIAL INSPECTION.

All of the States except Vermont and Connecticut have special laws providing for the enforcement of these milk regulations.

In Massachusetts, cities are required and towns are allowed to appoint milk inspectors. In Boston the present milk inspector is a man of ability and energy. He has a respectable salary and sufficient appropriation for collectors of samples, laboratory, etc. Hence the work of milk inspection in that city is very efficiently performed. The following statistics of his work show how thorough it is, and also, inferentially, something of the quality of the Boston supply, the ratio of samples taken to court cases being very small.

Year.	Samples taken.	Cases in court.	Year.	Samples taken.	Cases in court.
1886 .....	8,701	88	1893 .....	13,623	293
1888 .....	9,484	67	1895 .....	12,587	316
1890 .....	13,853	220	1897 .....	12,295	129

In a number of other Massachusetts cities—Lowell, for instance—good work is also done; but in most cases the salary is nominal and the work corresponds, though most of the inspectors earn more than they get. Very few of the towns avail themselves of the permission to appoint inspectors. To cover the field where local inspection is weak, the State board of health and the State dairy bureau are also given authority to enforce the dairy laws. The following statistics show the work of the board of health, scattered over the State:

Year.	Samples taken.	Court cases.	Year.	Samples taken.	Court cases.
1890 .....	3,236	24	1893 .....	3,073	67
1891 .....	2,726	49	1894 .....	3,551	76
1892 .....	3,271	72	1897 .....	6,104	48

Convictions followed in about 90 per cent of the cases.

Rhode Island has a law similar to Massachusetts as regards local milk inspectors. New Hampshire law permits the appointment of such officers. In Maine, cities and towns of not less than 3,000 inhabitants must appoint milk inspectors. In most cases, however, in all of these

States there is little inspection and in many cases no inspector. Particular mention should be made of the good work in Providence, R. I., Nashua, N. H., and Hartford, Conn. The inspector of the latter city is appointed under the provisions of a city ordinance.

The regulations in the different States as to the duties and authorities of milk inspectors are similar. The inspectors and collectors of samples employed by them are authorized to enter all places where milk is stored or kept for sale and all carriages used for the conveyance of milk and take samples for analysis from all such places or carriages.

The laws of the different States where there are milk inspectors provide for registering and licensing milk dealers for a nominal fee. This is done for the purpose of securing proper identification of the dealer.

The legal supervision hitherto noticed has related almost entirely to the commercial fraud of selling less food than the purchaser supposes he is receiving for his money—*i. e.*, milk watered, skimmed, or naturally of less than average quality.

#### SANITARY LAWS AND INSPECTION.

All of the States have laws relative to the healthfulness of the milk supply. Massachusetts, Maine, Rhode Island, and New Hampshire prohibit the sale of milk from sick or diseased cows or cows fed upon the refuse of breweries or distilleries or upon any substance deleterious to its quality. Connecticut prohibits the sale of "impure milk" and milk from cows which shall have been adjudged by the commission upon diseases of domestic animals to be affected with tuberculosis or other blood disease. A Massachusetts law imposes a fine upon "whoever knowingly feeds or has in his possession with intent to feed to any milch cow any garbage, refuse, or offal collected by any city or town."

There is, however, no especial sanitary inspection of milk and its sources in any New England town or city, and cases are rarely brought in court for violation of any of the above sanitary laws. The milk inspection now in vogue relates almost exclusively to commercial frauds rather than to health matters. The Massachusetts state board of health has done some good work in investigating several typhoid-fever epidemics, which in a number of cases have been traced to the milk supply. Local boards of health, however, have considerable authority, and in several cases they have issued orders or made regulations in advance of the average practice of the State. Hartford, Conn., Portland, Me., and Lynn, Mass., are instances. The contagious-cattle-disease law of Massachusetts provides for a cattle inspector in each town, who makes a semiannual inspection of neat stock, quarantining suspected animals, which are subsequently tuberculin-tested, and if found to be diseased are destroyed. In a few instances—Pittsfield, for example—the milk inspector and cattle inspector are one and the same person, which is a decided advantage.



The milk inspector of Nashua, N. H., has a unique and commendable system of sanitary inspection of the milk supply of that city, which is said to work well. Although his official powers are confined to the city limits and to the commercial fraud of selling adulterated or low-grade milk, all peddlers—mostly producers—are required to answer the following questions when they register:

1. Name of owner? 2. Number of cows? 3. Number of each breed? 4. Food of cows? 5. How is manure stored? 6. Quantity of milk produced per day? 7. Where is milk stored? 8. How is milk cooled? 9. Temperature of milk when sold? 10. Source of water supply for stock and for washing cans? 11. Distance of water supply from barnyard; from privy vault; from cesspool? 12. Are any cows sick upon your premises; if so, how many, and with what disease? 13. Are any persons engaged in handling milk sick?

The inspector also calls from time to time on the farmers who produce milk for the city, even when they reside out of his official jurisdiction. He makes such investigation of the premises as he is permitted, and reports to the board of aldermen the condition of affairs. The board then orders the report published in the local papers. To most milk producers the publicity of an unfavorable milk report is more of a punishment than a court fine, while a favorable report is a valuable advertisement. Hence, as much is accomplished as if there were more stringent laws, and there is none of the friction that might arise from over-officiousness or unpopular official prying. He also issues the following:

[Circular.]

CITY OF NASHUA, N. H.,  
DEPARTMENT OF MILK INSPECTION.

The importance of education in the better care of milk is so great that I feel it a duty to call attention to certain precautions necessary to a good product. The average farmer has so many cares that he sometimes fails to give this important subject proper attention.

Milk in the udder of the healthy cow contains none of the microorganisms of fermentation or decay, and could it be drawn thence into an hermetically sealed receptacle, without coming in contact with the air, it would keep without change for an indefinite time. Of course this is not practicable in an ordinary dairy, but care can certainly be exercised that the surrounding atmosphere with which it does come in contact is as free as possible from germs, odors, or taints, for these the milk absorbs with great rapidity.

Milk which has stood for ten minutes in an open vessel in a tainted atmosphere will be found to contain from 10,000 to 100,000 germs per cubic centimeter (a cubic centimeter represents about one-third of a cubic inch), while in two hours from 2,000,000 to 5,000,000 germs will be found per cubic centimeter. This prodigious increase can be stopped by removing the milk to a proper cooler. I have explained the necessity of pure water and wholesome food for cows so often before that I will not repeat it. But I wish to call attention to the following precautions in the handling of milk:

All stables should be ventilated.

They should be as clean as possible.

Cows should be carefully groomed.

The milk should be drawn from the cow as rapidly as possible.

The milk should not be left standing in the stable a moment longer than necessary.

The cooler should be so remote from the stable that no odors can reach it.

Its temperature should be at from 45° to 50° F., and

The milk should be aerated to remove animal odors.

Under these improved conditions cows not only yield better milk but more of it, and amply repay the labor and trouble expended upon them.

There are in this vicinity dairies infamous alike in their cruelty to animals, in their brutalizing influence upon men, and in their disease-spreading effects upon infants and the general community; but I believe that a vast majority of our farmers desire to do right if but the means and knowledge were presented to them.

I. F. GRAVES, *Inspector of Milk.*

*Health orders.*—The board of health of the city of Boston has the following regulation:

Whereas cows' milk is one of the most common and necessary articles of food, and is oftentimes seriously impaired in usefulness and rendered dangerous to health by the want of proper care in its production or subsequent treatment and handling; it is, therefore, ordered that the following regulation be and is hereby adopted:

SECTION 1. No person shall use any building as a stable for cows unless it contains at least 1,000 cubic feet of space for each animal, is well lighted and ventilated, has tight roof and floors, good drainage, a supply of pure water, and all other necessary means for maintaining the health and good condition of the cows, and has been approved by the board of health.

SEC. 2. Every person using any such building shall keep the same and the premises connected therewith, and all land used for pasturage of the cows, clean and free from filth.

SEC. 3. Every person keeping a milch cow shall permit it to be examined from time to time, as to its freedom from disease, by a veterinarian designated by the board of health.

SEC. 4. No person having an infectious disease, or having recently been in contact with any such person, shall milk cows or handle cans, measures, or other vessels used for milk intended for sale, or in any way take part or assist in handling milk intended for sale, until all danger of communicating such disease to other persons shall have passed.

SEC. 5. No person shall sell or use for human food the milk of a diseased cow, or permit such milk to be mixed with other milk, nor until it has been boiled shall use such milk, or any mixture of such milk, for food of swine or other animals.

#### QUALITY OF MILK SOLD.

The word quality when applied to milk may mean the amount of milk solids (which is the best acceptance) or it may have reference to flavor, disease germs, bacteria of decay, etc. From what has been said above it will be seen that in whatever sense we use the word the quality of milk receives considerable attention, especially as to its composition.

In Massachusetts the law creating a legal standard of 12 and 13 per cent is well enforced, and milk in the market usually averages even above the standard. All of the large Boston wholesalers employ chemists, who devote all of their time to testing the supplies which they receive. If the milk of any dairy is below the statute standard, warning is sent to the producer, and if the warning does not result in an improved quality of milk the supply from that dairy is dropped. In some instances where there is unmistakable evidence of watering the

case is turned over to State officials for prosecution. This unofficial inspection weeds out a lot of milk that might be below the standard before it is put on the market, and insures to peddlers the purchase of milk that will not get them into trouble.

In Providence a lower standard exists than in Massachusetts, which causes the milk inspector some trouble. Most natural milk has over 12 per cent of solids. A small amount of water can be added to 13 or 14 per cent milk without changing the proportion of fat and solids not fat sufficiently to warrant a verdict against the adulterator. Most judges will convict only when the milk is below the statute standard, and do not feel convinced of the guilt of the defendant on the simple assertion of a chemist that the relation of fat and solids not fat is such as to create a certainty that the milk is adulterated.

In the smaller cities and towns statistics from samples of milk taken by various officials show, usually, a higher quality than samples from milk sold in Boston or Providence, although the milk in those places is up to the statutory standard, for the closer the contact between the producer and consumer the better the quality of the milk. The occasional meeting of producer and consumer, face to face, has a tonic and stimulating effect on the former, which tends to keep up the quality of the milk supply. One of the disadvantages of shipping milk by railroad is that the producer never sees the consumer, oftentimes not even the peddler, and has no interest in his supply further than to avoid a word of warning from the contractor's chemist.

Milk substantially above the statutory standard is more frequently found among farmers retailing their own milk supply direct to consumers than elsewhere.

The following is the result of analyses of milk taken from milkmen by officers of the Massachusetts Dairy Bureau in the regular discharge of their routine duties, and throws an accurate sidelight on the per cent of solids sold. These samples were taken in May and June, when the legal standard is 12 per cent.

Worcester: Samples from 28 milkmen ranged from 12 to 14.34 per cent total solids and averaged 13.06 per cent.

Taunton: Five samples ranged from 12.54 to 14.28 and averaged 13.50 per cent.

New Bedford: Thirty samples ranged from 11.84 to 15.02 and averaged 13.30 per cent; 14 of them were above this average.

The following are the figures of four days' routine work of the Boston milk inspector. The standard for July is 12 per cent.

14777—No. 20—3

*Inspections for four days in July.*

	26th.	27th.	28th.	29th.
Samples from shops ..... Number..	20	9	19	0
Samples from wagons .....do.....	30	21	31	30
	50	30	50	30
Above the standard:				
From shops .....do.....	19	9	18	0
From wagons .....do.....	30	20	31	27
	49	29	49	27
Below the standard:				
From shops .....do.....	1	0	1	0
From wagons .....do.....	0	1	0	3
	1	1	1	3
Poorest sample above standard ..... Per cent..	12.12	12.06	12.06	12.25
Poorest sample found .....do.....	11.92	11.96	11.20	11.40

The Providence milk inspector reported that he examined 24 samples of milk on the 24th of July and 47 samples on the 26th, and found the results as follows:

Number of samples.	Total solids (per cent.).			Fat (per cent.).			Solids not fat (per cent.).		
	High-est.	Low-est.	Aver- age.	High-est.	Low-est.	Aver- age.	High-est.	Low-est.	Aver- age.
24 .....	13.75	11.10	12.60	5.00	3.00	3.81	9.40	7.50	8.80
47 .....	* 14.35	† 9.65	12.21	* 6.00	2.20	3.59	9.39	† 7.25	8.63

\* Same sample.

† Same sample.

This inspector remarks: "This does not represent the average quality of the milk sold in Providence, neither would the figures obtainable for any other two days, unless by chance."

The following figures are from the inspector of milk at Lowell:

	Per cent.	Number of samples.
Average solids for February, 1897 .....	13.42	197
Average solids for June 5, 1897 .....	12.96	237
Average solids for June 21, 1897 .....	13.06	23
Average solids for July 19, 1897 .....	12.82	24

The above figures will give some idea of the amount of solid matter in milk as sold in New England cities.

Regarding milk in the second sense of the word "quality," we are confronted by two positive opinions, and those apparently very contradictory. In spite of the healthfulness of the Boston milk supply, Professor Sedgwick, of the Institute of Technology, a bacteriologist of note, embraces every opportunity to criticise Boston milk.

On the other hand, Dr. Conn, of Wesleyan University, a well-known bacteriologist who has made dairy products a special study, says what might be construed as a flat contradiction—that Boston has probably a better milk supply than any other city in the world. There is doubtless truth in both statements, their seeming inconsistency being explained by the different standpoint of the two students. One speaks from the



standpoint of the idealist, and finds much that needs condemnation; the other speaks of things comparatively, as he finds them in many places.

Much of the milk supply of Boston comes from such distances that the selfish interests of the producers compel precautions that otherwise would be unnecessary. Filthy milk, drawn under indifferent conditions, will not be sweet and wholesome when from 40 to 70 hours old. Consequently, the railroad milk must be, even without legal requirement, more or less carefully attended to. Many of the farmers who ship milk to Boston have ice or running spring water for the quick and immediate cooling of milk, and if their methods get too slovenly the fact is recorded in the poorer keeping qualities of the milk, and sometimes in its return as sour. It is often the fact that the precautions necessary to care for this milk shipped from a distance are such that after arriving in the city it will keep longer than milk from nearby, the producer of the latter not taking so much pains because the milk was to be delivered at once.

The general dissemination of information as to the bacteriological cause of milk's souring—the work of colleges, experiment stations, and newspapers—is leading farmers to become more and more particular in regard to cooling it as soon as possible after milking, and taking the other necessary precautions for the purpose of insuring its keeping. Another influence, however, is pulling the other way. Quite a change in the nationality of the farmers is going on. Farms are passing from the native New England stock into the hands of those more recently descended from other countries, thrifty, industrious people, and good citizens, but for the time being in some instances they are not as well informed in the latest and best agricultural methods. They are not book farmers, and frequently a change of farm owners means a temporary deterioration in the milk supply from that farm.

The methods of some city peddlers are open to criticism; their milk headquarters and their stables are often one and the same building, and sometimes the mixing and canning is not done under perfectly clean conditions.

Outside of Boston the milk supply is reasonably good, as the times go. A general improvement in the supply of the different cities is reported by correspondents. They say that the farmers producing milk are generally reliable and honest; that it is for the most part cooled in running water or ice tanks, and that great improvement has been made during the last few years. Nearly all, however, urge further advances along this line; and while most of the correspondents not only note improvement but claim that their town or city compares well with others, they recognize room for further improvement, and call especial attention to the need of more cleanliness in every department—in vehicles, cans, and the milkmen themselves. Some emphasize the importance of more care in cooling and aeration.

The general attention which has been given to tuberculosis during the past few years has resulted in the destruction of many tuberculous herds, and this has doubtless had a beneficial effect on the milk supply. All of the New England States, except possibly Rhode Island, have had popular agitations of this subject, and sharp dissension has arisen. The point in dispute has been whether the degree of danger from tuberculous milk was sufficient to warrant the public expense and losses to cow owners incident to radical measures in combating the disease. Whatever may be the views of different persons on this subject, all must admit that many tuberculous herds have been exterminated, and that this, at least, can not have injured the milk supply. As a result of this agitation, every town in Massachusetts has a cattle inspector, who makes a semiannual examination of the cows in his town. His official authority is confined to quarantining suspected animals, but the system has done much good in a suggestive way, in improving ventilation, increasing the amount of light, and reducing the uncleanness of stables.

On the whole, the milk supply of New England cities seems reasonably up to the best average practice of the present times.

#### NEED OF ADVANCED PRACTICES.

As to more advanced practices, however, it seems that very little is being done. The ideal way of selling milk is not on a dead level at one price, but on its merits and at a price proportionate to quality. A little is already being done in this direction, and a number of dairymen with Jersey or Guernsey herds sell milk above the going price. But we know of no milk sold on a guarantee of its content of solids. It commands an extra price because people know that the milk of such cows is richer than the milk of other cows, and also because it has an improved quality in other directions.

A large dairy farm in Worcester County has for years run to Boston a car of milk from superior Jersey herds, which has been sold above the current price for milk, for the most part at 10 cents per quart. No specific amount of total solids has been guaranteed, but the milk has been better than 13 per cent—nearer 15. When individual glass bottles first came in vogue this company was a pioneer in their use, and later when tuberculin was discovered it was the first to advertise milk from tuberculin-tested cows. Indeed, it still produces the only milk so advertised and sold in Boston. Great pains is taken with the milk on the farm and it is always in good condition.

A resident of the city of Newton, a residential suburb of Boston, has developed a milk business calling for the product of about 150 cows. The milk is sold within a narrow radius to people who might be called his neighbors, who have seen or heard of his methods, and who desire the milk. His cows are Jerseys, tuberculin-tested, kept in one-story barns, with no manure cellar underneath and no hay lofts

overhead. Light and ventilation are ample. Scrupulous cleanliness prevails. Great pains is taken to promote the comfort of the animals. The newest barn has no stanchions, but provides a box stall 7 by 9 feet for each cow. The milk is run through a cooler as soon as drawn, and kept cool by artificial refrigeration—ammonia process. It is then bottled in glass jars, being at a temperature of 38 to 40 degrees, and delivered at once to customers. There are two deliveries a day, and the milk is not over two hours old when in the hands of consumers.

The use of glass jars for the delivery of milk is growing and is somewhat common, though used as yet by a small minority of milkmen. Pasteurizing milk is done only to a limited extent. Here and there some pioneer has entered into this field. The Massachusetts Agricultural College and one or two enterprising dairy farmers within reach of Boston have recently added pasteurizing apparatus to their dairy equipment, and are selling sterilized milk and cream. The number who sell pasteurized milk, in proportion to the whole, is extremely small; still there has been a satisfactory beginning, and frequently additions are made to the number of those who are advancing in this direction.

The pasteurizing of cream is more common. Some of the concerns who supply cream in a wholesale way pasteurize all of their output to enhance its keeping qualities.

A company started in Boston several years ago the sale of "modified" milk. By patent processes this "laboratory" prepares from cream, skim milk, and sugar of milk a compounded milk of any desired composition, for infants and invalids. The company has its own herd of cows, well cared for, to supply the milk.

Some of the large milk dealers of the city are experimenting with filtered milk, and introducing it on a limited scale. The process enhances its keeping qualities, and the milk so treated has been shown by microscopical examination to be almost as free from bacteria as pasteurized milk.





U. S. DEPARTMENT OF AGRICULTURE.

BUREAU OF ANIMAL INDUSTRY.

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# SHEEP SCAB:

## ITS NATURE AND TREATMENT.

BY

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AND

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## LETTER OF TRANSMITTAL.

U. S. DEPARTMENT OF AGRICULTURE,  
BUREAU OF ANIMAL INDUSTRY,  
*Washington, D. C., March 15, 1898.*

SIR: I have the honor to transmit herewith, for publication as a bulletin of this Bureau, a discussion of "Sheep Scab: Its Nature and Treatment." The disease known as scab is one of the most serious drawbacks to the sheep industry and results in enormous financial losses. Yet, despite its insidious nature, its ease of transmission, its severe effects, and its prevalence in certain localities, it is a disease which yields readily to proper treatment. If all of the sheep owners of the country would dip regularly and thoroughly, there is no reason why this scourge should not be totally eradicated from the United States. There should be stringent scab laws in every State, with State inspectors to see that those laws are carried out.

The sheep raisers of this country are intelligent and progressive men, and most of them fully recognize the necessity of combining to eradicate this disease. In many cases, however, more particularly among owners of small flocks, there are many erroneous ideas prevalent regarding the exact nature of the disease and the methods by which it may be eradicated. It is to meet the demand for exact information on this subject that this bulletin has been prepared. In it will be found a description of the various kinds of scab, references to conditions which may be mistaken for scab, a description of various kinds of dipping plants suitable for use on small and on large farms, directions for preparing certain homemade dips, and directions for dipping. The investigation of various kinds of dips will be continued by this Bureau, and supplementary circulars will be published if necessary.

In the preparation of the bulletin the writers have received valuable assistance from Dr. Schroeder, Director of our Experiment Station.

Respectfully,

D. E. SALMON,  
*Chief of Bureau of Animal Industry.*

Hon. JAMES WILSON,  
*Secretary.*





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# SHEEP SCAB: ITS NATURE AND TREATMENT.

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## HISTORICAL INTRODUCTION.

The disease commonly called sheep scab is the mange, or scabies, of the sheep. It is a contagious skin disease caused by a parasitic mite. This disease is one of the oldest known, most prevalent, and most injurious maladies which affects this species of animals. It has been well known for many centuries, and references to it are found in the earlier writings, including the Bible, where we find, in Leviticus, xxii: 22, the use of scabbed sheep forbidden in sacrifices. Some think that the mite which causes the disease was known to Aristotle, 322 B. C.; but it appears that Wichmann, writing in 1786, was one of the first authors of modern times to suspect that sheep scab was of the same nature as the scabies of man. Wichmann held the erroneous view, however, that both diseases were produced by the same parasite.

The prevailing opinion concerning scab prior to and during the first years of the present century was that it was caused by some special condition of the sheep's system, a "humor of the blood," which led to a skin eruption. The parasites were in some cases known and recognized, but they were supposed to be either an accidental occurrence or to have arisen by spontaneous generation as a result of the disease, and because the affected skin offered conditions favorable to their development and existence.

As a result of diligent research, certain investigators reached the conclusion that the malady was due directly to the mites which were found inhabiting the diseased parts of the skin. Their opinion was not at once adopted, however, but, on the contrary, met with strong opposition from those who held that scab was due to a diseased condition of the blood and from others who held a modified view to the effect that the mites carried poisonous or diseased material from one animal to another and in that manner communicated the disease. The errors and uncertainties which came down to us through centuries of controversy were finally and for all time dispelled by conclusive experiments upon animals made during the first half of this century. It was shown that scab does not develop and can not be produced without the parasites. The complete life cycle of the mites was studied and demonstrated from the eggs to the adult parasites. It was shown that mites are always the offspring of ancestors, the same as are the larger animals, and it has in later years come to be admitted that there is no such thing known

as spontaneous generation of any living thing under any circumstances. The demonstration was repeatedly made that the disease always developed if mites were taken from diseased sheep and placed upon healthy ones, and that diseases of the skin resembling scab are not contagious unless the mite is present.

Questions are still frequently asked, by persons not conversant with the investigations of the subject, as to whether the scab is the cause of the mite or the mite is the cause of the scab, and also whether the disease can develop without the presence of the scab mite. The investigations which have been referred to answer these questions and also show that the treatment must consist in external applications for the destruction of the parasites and not internal remedies to "purify the blood."

*Is scab hereditary?*—An impression has arisen among some sheep raisers that scab is hereditary. This impression is, however, erroneous. Scab is no more hereditary than are sheep ticks or sheep lice, for the parasites which cause it live on the external surface of the body and do not reach the womb. It is possible, however, for a lamb to become infected from a scabby mother at the moment of birth or immediately after. Lambs are occasionally born with white spots on their skin, and this possibly has given rise to the idea that scab is hereditary.

#### LOSSES CAUSED BY SCAB.

*Losses in home industry.*—The losses from sheep scab have been and are still very severe in most sheep-raising countries. They are due to the shedding of the wool, the loss of condition, and the death of the sheep.

Although laws were made for the control of the disease as early as the beginning of the eleventh century, general ignorance in regard to its nature and proper treatment has prevented the successful administration of such laws even to the present day. The disease exists in most of the countries of Europe, and also in Asia and Africa, and until recently in Australia. Most civilized countries now control the disease to a certain extent, and limit the losses by the enforcement of stringent sanitary regulations; but the extent of its prevalence is nevertheless surprising. It is a disease not difficult to cure and eradicate, and an accurate knowledge of its characteristics with attention to details are all that is needed to secure this result.

In the United States some sections have been overrun with sheep scab, and many persons engaged in the sheep industry have been forced to forsake it because of their losses from this disease. It is probable that in its destruction of invested capital sheep scab is second only to hog cholera among our animal diseases. The large flocks of the Plains and Rocky Mountain region and the feeding stations farther east have suffered severely and are constantly sending diseased animals to the great stock yards of this country. As a consequence of this marketing of affected sheep, the stock yards are continually infected, and any



sheep purchased in these markets are, unless properly dipped, likely to develop the disease after they are taken to the country for feeding or breeding. There is in this way a constant distribution of the contagion, and thousands of persons who know little of its nature or the proper methods of curing it find that they have introduced it upon their premises.

*Losses in export trade.*—In addition to the direct losses in wool, in flesh, and in the lives of our sheep, we have suffered immensely in our foreign trade because of the prevalence of this disease. Great Britain appears to have been the first country to prohibit live sheep coming from the United States, by an order issued in 1879. Upon representations that there was no foot-and-mouth disease in the United States this order was rescinded in 1892, but only to be again enforced in 1896 on account of the many scabby sheep sent abroad by our exporters. Our sheep are consequently slaughtered on the docks where landed, the market being restricted and the prices much less favorable than would otherwise be obtained. The markets of Continental Europe have been entirely closed to American sheep, as even the privilege of slaughtering at the landing places is denied. For a long time it was impossible to send our pure-bred sheep to Australia, where there is a demand for them for breeding purposes, because the Australian law required them to be transshipped and quarantined in British ports, and the British authorities declined to grant this privilege. Arrangements have since been made for the direct shipment of sheep to Australia, if accompanied by the certificate of a veterinarian appointed by the Australian authorities.

On the whole, it is seen that the existence of this disease in our flocks has prevented the development of our export trade in many directions, and has caused no end of trouble and loss to our exporters.

#### CAUSE OF SCAB.

Sheep scab is a strictly contagious disease.

*Common sort.*—Common sheep scab is caused by that species of mites technically known as *Psoroptes communis*.<sup>1</sup> Parasites of this species cause scab in horses, cattle, sheep, goats, and rabbits; but for each of these species of animals there appears to be a distinct variety of this parasite. Although it is more or less difficult to distinguish between these varieties, they differ somewhat in size, and it is found that the *Psoroptes communis* of the sheep does not cause scab of the horse, ox, or rabbit; nor, on the other hand, does the *Psoroptes communis* of the horse, ox, or rabbit cause scab of the sheep. Natural-

<sup>1</sup>The technical term *Psoroptes* is derived from the Greek, and means that the mites hide under the crusts. The parasite is sometimes called *Dermatocoptes*, which means that the mites wound the skin. A third name, *Dermatodectes*, indicates that the mites bite the skin.

ists, therefore, distinguish the parasite of sheep scab by the name *Psoroptes communis* var. *ovis*.<sup>1</sup>

The parasite of this disease is one of the larger mites, and is quite easily seen with the naked eye. The adult female is about one-fortieth inch long and one-sixtieth inch broad; the male is one-fiftieth inch long and one-eightieth inch broad. These mites are discovered more readily and more clearly on a dark than on a light background, and for that reason the crusts from the affected skin are often placed upon black paper and kept in the sunshine for a few minutes in order to reveal the parasites crawling about.

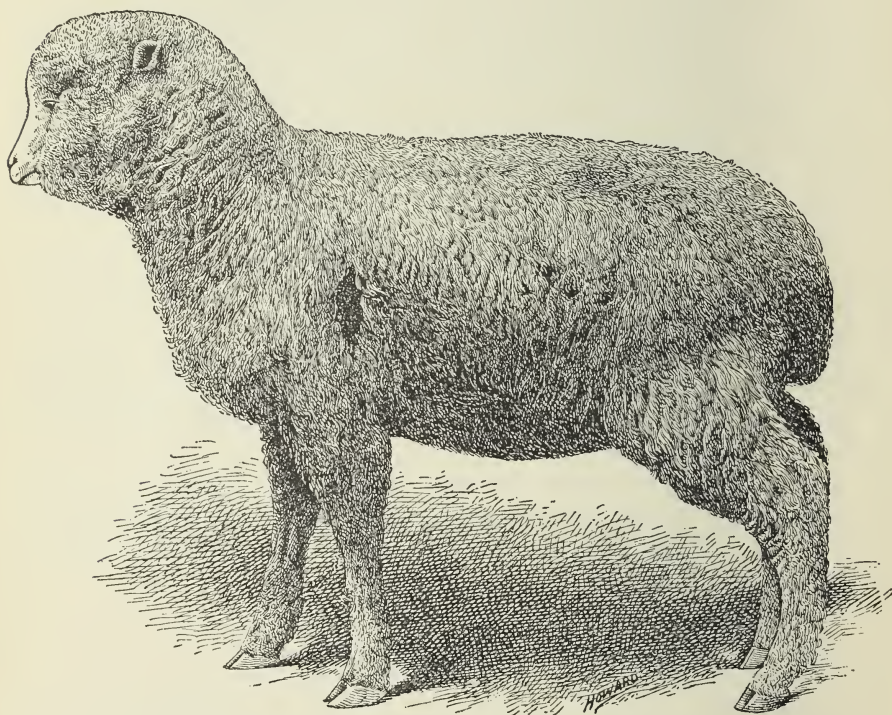


FIG. 1.—A comparatively early case of common scab, showing a bare spot and a tagging of the wool.

The psoropt inhabits the regions on the surface of the body which are most thickly covered with wool; that is, the back, the sides, the rump, and the shoulders. It is the most serious in its effects upon sheep of any of the parasitic mites, and it is the cause of the true body scab.

*Other forms.*—Sheep are also affected with three other forms of scab, likewise caused by parasitic mites. One of these is the sarcoptic scab (head scab, or black muzzle), which is limited almost entirely to the head, and is caused by the mite known as the *Sarcoptes*

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<sup>1</sup> Var. is the abbreviation of the Latin word *varietas*, meaning variety.





FIG. 1. A SLIGHTLY ADVANCED CASE OF COMMON SCAB.

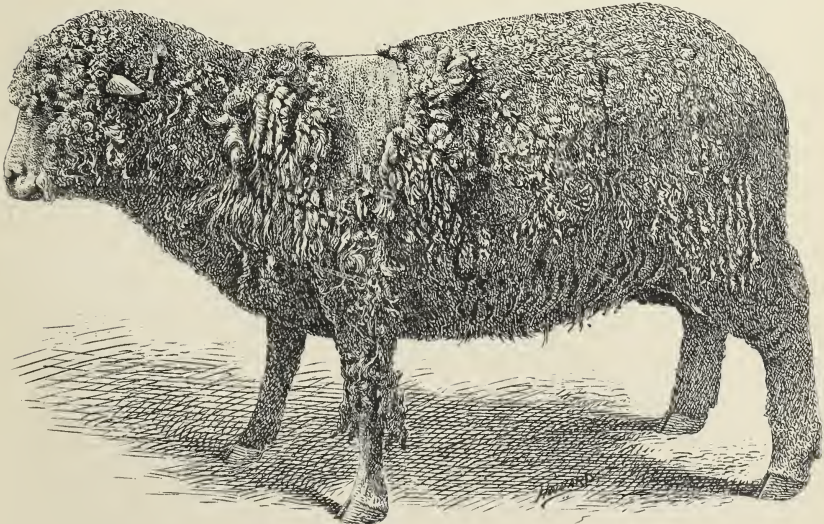


FIG. 2. A MORE ADVANCED CASE OF COMMON SCAB.





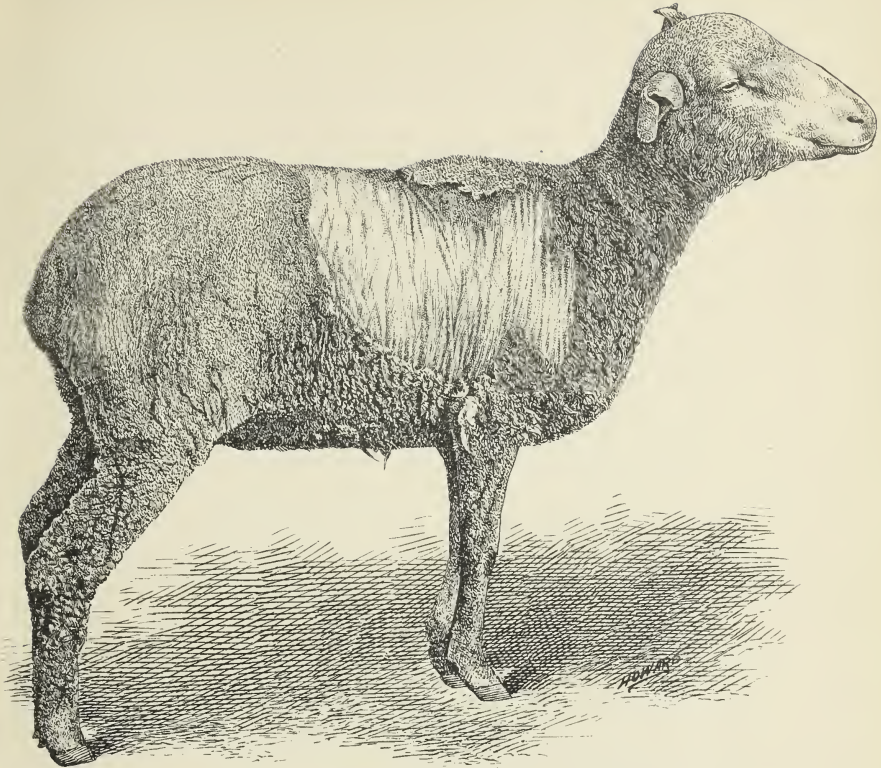


FIG. 3. A SHORN SHEEP WITH LARGE BARE AREA DUE TO SCAB.

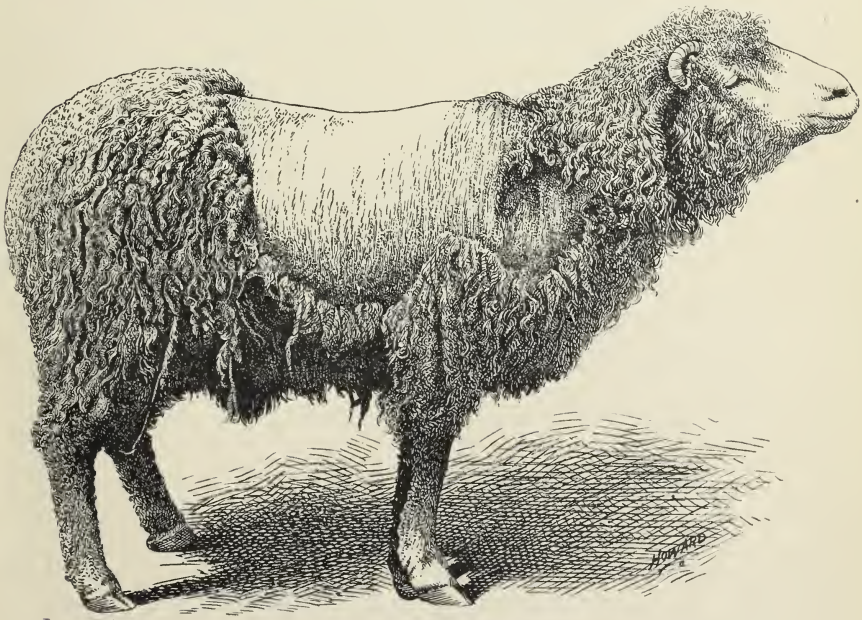


FIG. 4. AN ADVANCED CASE OF COMMON SCAB.



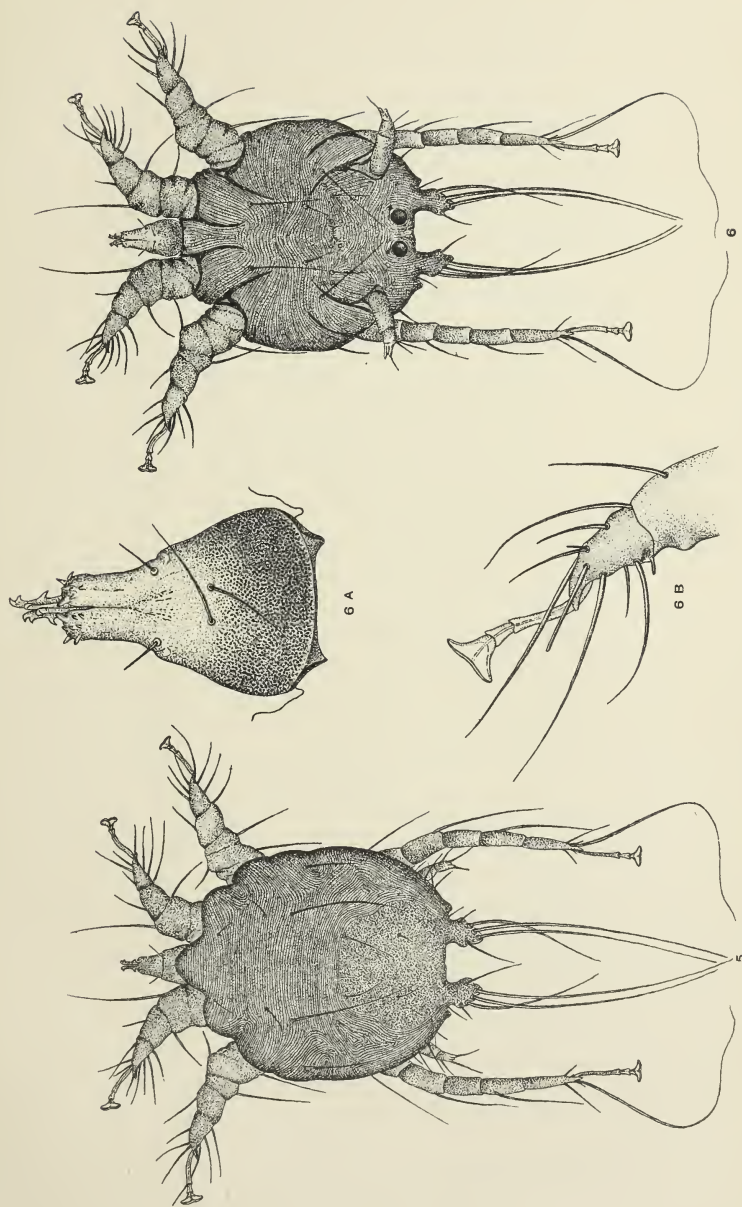


FIG. 5. ADULT MALE PARASITE OF COMMON SHEEP SCAB, DORSAL VIEW. FIG. 6 VENTRAL VIEW OF SAME. FIG. 6 A. HEAD OF FEMALE. 6 B. LEG OF FEMALE. ALL GREATLY ENLARGED.





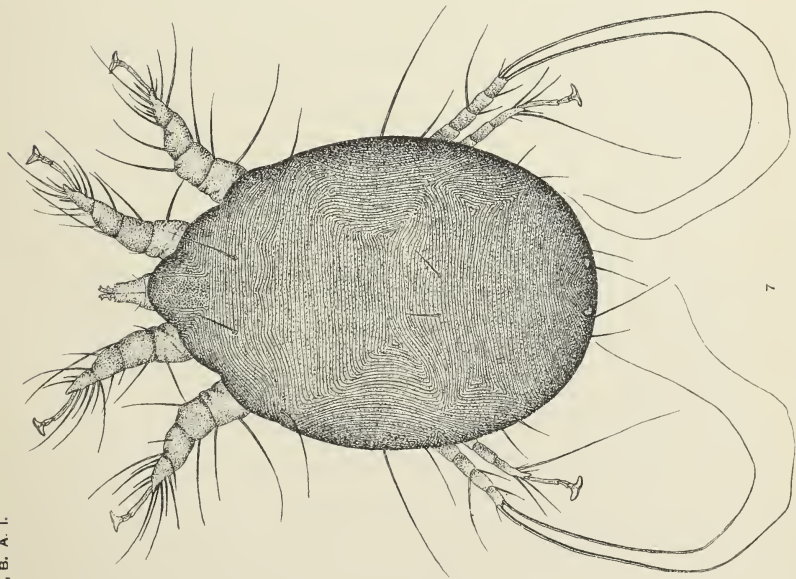


FIG. 7. ADULT FEMALE PARASITE OF COMMON SHEEP SCAB, DORSAL VIEW.

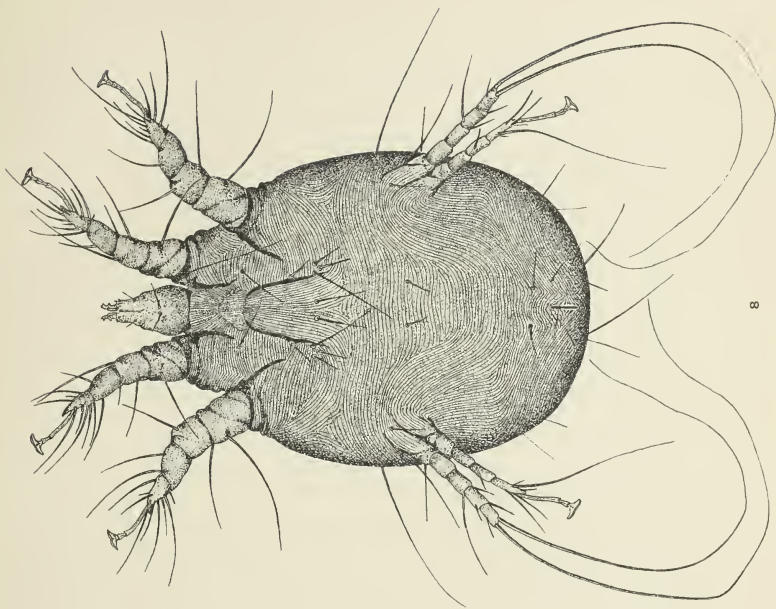


FIG. 8. VENTRAL VIEW OF SAME.

BOTH GREATLY ENLARGED.



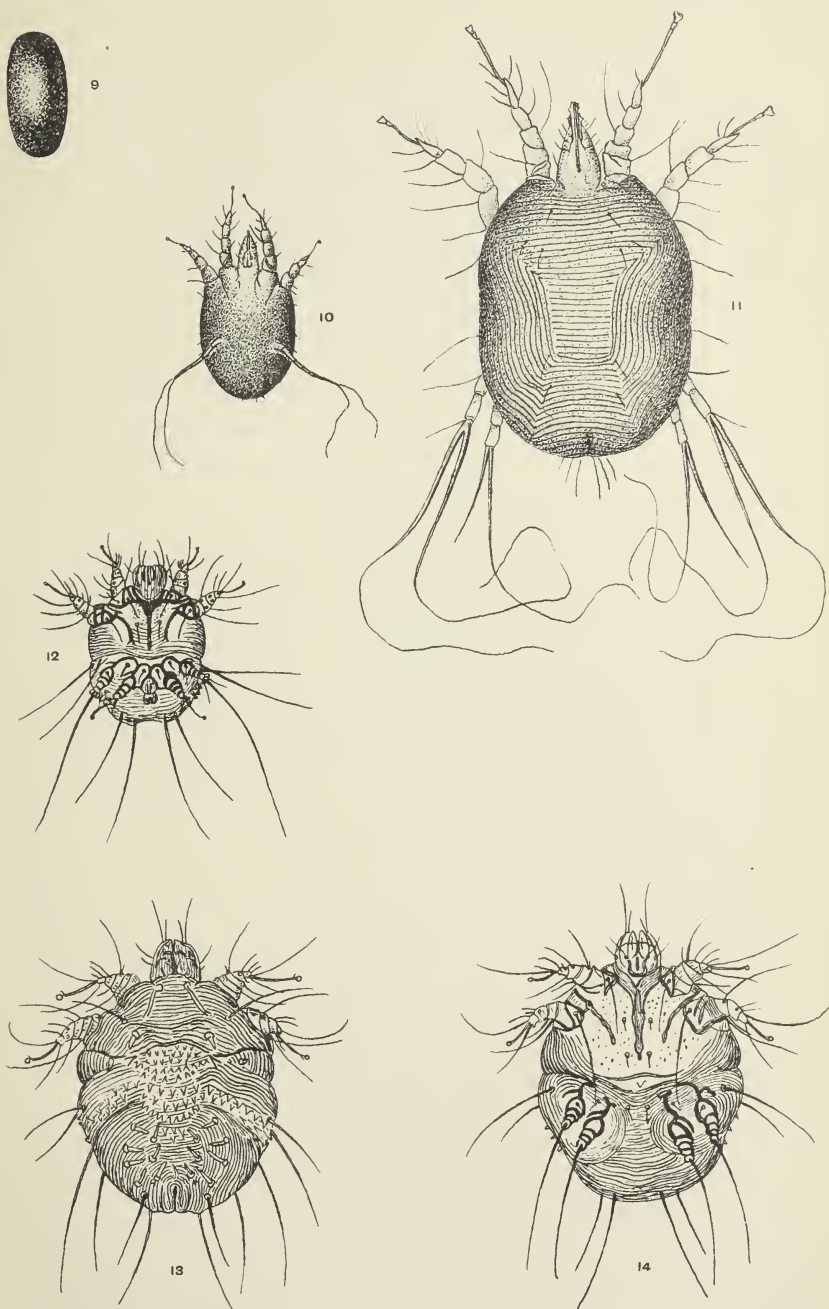
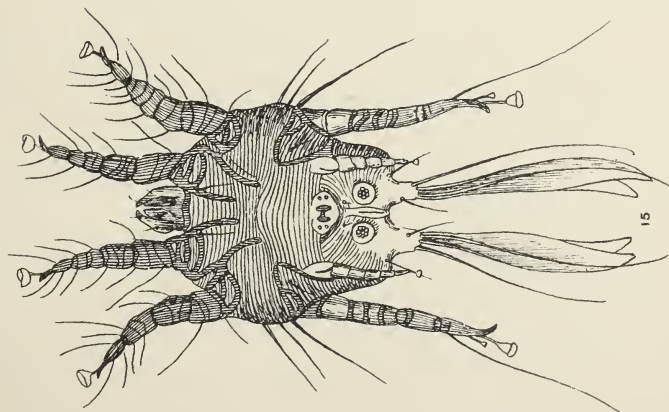


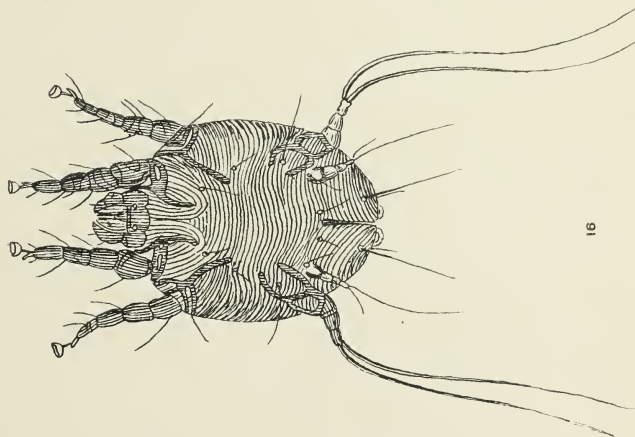
FIG. 9. EGG OF MITE WHICH CAUSES COMMON SHEEP SCAB. FIG. 10. SIX-LEGGED STAGE OF SHEEP SCAB MITE. FIG. 11. YOUNG FEMALE BEFORE MOULTING FOR THE LAST TIME, DORSAL VIEW. FIG. 12. ADULT MALE PARASITE OF SARCOPTIC SCABIES OF MAN (THE CORRESPONDING PARASITE OF SHEEP IS VERY SIMILAR), VENTRAL VIEW, X 250 (AFTER BLANCHARD). FIG. 13. ADULT FEMALE PARASITE OF SARCOPTIC SCABIES, DORSAL VIEW, X 250 (AFTER BLANCHARD). FIG. 14. SAME, VENTRAL VIEW (AFTER BLANCHARD). ALL GREATLY ENLARGED.



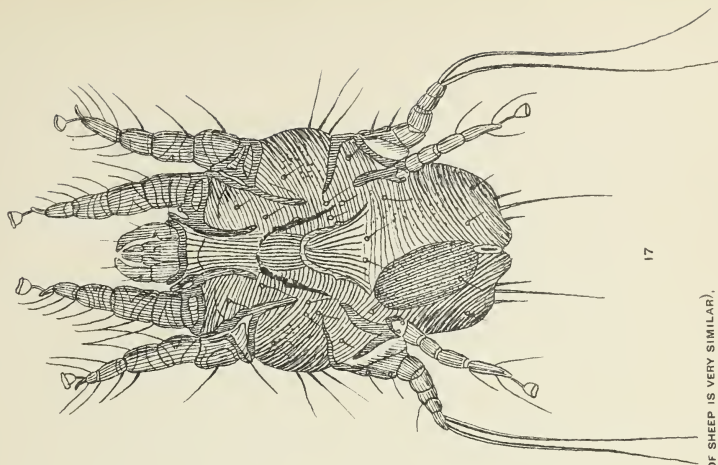




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FIG. 15. ADULT MALE PARASITE OF CHORIOPTIC SCABIES OF THE HORSE (THE CORRESPONDING PARASITE OF SHEEP IS VERY SIMILAR), VENTRAL VIEW. FIG. 16. YOUNG FEMALE PARASITE OF CHORIOPTIC SCABIES, VENTRAL VIEW. FIG. 17. ADULT FEMALE PARASITE OF CHORIOPTIC SCABIES WITH EGG, VENTRAL VIEW. (ALL X 100. AFTER NEUMANN.)



*scabiei* var. *ovis*.<sup>1</sup> The second is the symbiotic scab (foot scab), which affects the limbs, scrotum, and udder, and is caused by the *Chorioptes communis* var. *ovis*.<sup>2</sup> Lastly may be mentioned an extremely rare affection, the so-called follicular, or demodectic, scab, affecting the eyelids, caused by a mite known as *Demodex folliculorum* var. *ovis*.<sup>3</sup>

The sarcoptic, symbiotic, and demodectic forms of scab are with sheep mild diseases compared with common scab, and appear to be rather rare.

#### DESCRIPTION OF SHEEP SCAB.

##### (1) COMMON SCAB, BODY SCAB, OR PSOROPTIC SCAB.

Although the symptoms of common scab are familiar to most farmers, they will here be briefly reviewed.

The mites of common, or body, scab—that is, the *Psoroptes*—prick the skin of the animal to obtain their food, and probably insert a poisonous saliva in the wound. Their bites are followed by intense itching, with irritation, formation of papules, inflammation, exudation of serum, and the formation of crusts, or scabs, under and near the edge of which the parasites live. As the parasites multiply they seek the more healthy parts, spreading from the edges of the scab already formed, thus extending the disease. The sheep are restless; they scratch and bite themselves, and rub against posts, fences, stones, or against other members of the flock. This irritation is particularly noticeable after the animals have been driven, for the itching is more intense when the sheep become heated. The changes in the skin naturally result in a falling of the wool; at first slender “tags” are noticed; the fleece assumes the condition known as “flowering;” it looks tufty or matted, and the sheep pulls out portions with its mouth, or leaves tags on the objects against which it rubs. Scabs fall and are replaced by thicker and more adherent crusts. The skin finally becomes more or less bare, parchment-like, greatly thickened, furrowed, and bleeding in the cracks. With shorn sheep especially a thick, dry, parchment-like crust covers the greatly tumified skin. Ewes may abort or bear weak lambs.

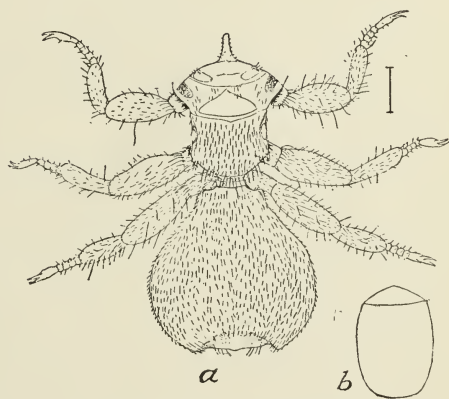


FIG. 2.—Adult sheep tick (a) and puparium (b) (*Melophagus ovinus*). Enlarged. (After Osborn, 1896; Bul. No. 5, Div. Entomology, Dept. Agr.)

<sup>1</sup> *Sarcoptes*, from the Greek, means that the mites wound the flesh.

<sup>2</sup> *Chorioptes* signifies that the mites hide in the skin. Another name, *Symbiotes*, signifies that a number of the mites live together; and a third name, *Dermatophagus*, means that the mites eat the skin.

<sup>3</sup> *Demodex* signifies that the mites have a worm-like body.

*Parts of body affected.*—When sheep are kept in large numbers the chances for infection are naturally greater, and the disease may begin on almost any part of the body. Generally, however, it affects the parts which are covered with wool. When the sheep are fat and the wool has a large amount of yolk, the progress of the disease may be slow; usually beginning on the upper part of the body, withers, and back, it extends slowly, but none the less surely and in ever-increasing areas, to the neck, sides, flanks, rump, etc. In two or three months the entire body may be affected.

*Contagion.*—Common scab is exceedingly contagious from one sheep to another, and may in some cases show itself within about a week after healthy sheep have been exposed to infection. The contagion may be direct, by contact of one sheep with another; or indirect, from tags of wool, or from fences, posts, etc., against which scabby sheep have rubbed, or from the places where the sheep have been “bedded down.” One attack of scab does not protect sheep from later attacks. Transmitted to man, sheep scab may produce a slight spot on the skin, a point which is sometimes taken advantage of for the purpose of diagnosis. In case of suspected scab, one of the crusts is bound lightly on the arm. After a short time an itching sensation is felt and the mites are found on the skin. Transmitted to horses, cattle, or goats, common sheep scab fails to develop.

*Chances for recovery.*—Cases of apparent spontaneous recovery are rare. Usually when proper methods of treatment are not adopted the disease increases, leads to anæmia, emaciation, exhaustion, and death, and may result in a loss of from 10 to 80 per cent of the flock. Scab is favored by seasons when the wool is longest, and by huddling or overcrowding the animals; also race, energy, temperament, age, state of health, length, fineness, and abundance of wool, and the hygienic conditions of the surroundings influence the course and termination of the disease. Young, weak, closely inbred animals, and those with long, coarse wool will most quickly succumb. Unhealthy localities, damp climate, and poorly ventilated sheds favor the disease. Pure or mixed Merino sheep succumb sooner than certain other breeds. The mortality varies according to conditions, but is highest in autumn and winter. When owners are careless the death rate may be very high; if untreated the sheep may die in two to three months. Hygienic conditions, good food, and cool dry atmosphere tend to check the disease. Sheep sheds should accordingly be well ventilated and open to light and sunshine. With proper attention to hygienic conditions and thorough dipping, a positive cure can be guaranteed.

*Vitality of the parasite.*—Taken from the sheep, the mites possess a remarkable vitality. It is generally stated that, kept at a moderate temperature on portions of scab, the adults may live from four to twenty days, but they will occasionally live much longer; cases are on record where they have lived three, four, or even six weeks when sepa-



rated from sheep; if the atmosphere is dry they will generally die in about fifteen days; but death is often only apparent, for the mites may sometimes be revived by warmth and moisture even after six or eight weeks; the fecundated females are especially tenacious of life. Various rather contradictory statements may be found regarding their resistance to cold: Krogmann states that they may live at a temperature of minus  $10^{\circ}$  C. ( $+14^{\circ}$  F.) for twenty-eight days; other authors claim that the mites die in two hours at  $47^{\circ}$  F.; still other authors, that they die at  $50^{\circ}$  C. ( $122^{\circ}$  F.). They are said to have been kept alive in cold water for six days and in warm water for ten days. Several authors admit, however, that the parasites are usually killed by a soaking rain; though it is claimed that in damp, dark stables they "may live for months."

Experience has shown that in some cases apparently healthy sheep have become infected in places where no sheep have been kept for four, eight, twelve, or even twenty-four months. The conditions underlying this infection are not thoroughly understood. Possibly some of the eggs have retained their vitality a long time and then hatched out; possibly the vitality of the fecundated female has also played a rôle; while it is not at all improbable that an entirely new infection has accidentally been introduced by birds or other animals. Certain authors of high standing scout the idea that birds can introduce an infection of scab, but there is no reason why birds should not do this, and there are some reasons for believing that they do. It has been noticed on the Experiment Station of the Bureau, for instance, that crows delight in perching on the backs of scabby sheep and picking at the scab; while so doing it is only natural that small tags of wool would adhere to their feet, and thus scatter scab. The fact that snails cling to birds' feet and are carried long distances is too well established to need discussion, and it is very probable that many of the cases where sheep are supposed to have become infected with scab on pastures which have not been occupied for one or two years are in reality cases of fresh infection by means of birds. From the data at hand, while it may be admitted that in some cases, under favorable conditions, the mites may live from spring to fall, it is scarcely within the limits of probability that either the scab mites or their eggs will live through a winter when separated from the sheep and exposed to the elements.

All matters connected with the vitality of the scab mite have an important bearing in explaining cases of indirect infection on roads over which scabby sheep have been driven, or in fields and sheds where they have been kept. From the facts now at our disposal we can lay down the following important rules:

(1) Scabby sheep should never be driven upon a public road; (2) sheds in which scabby sheep have been kept should be thoroughly cleaned, disinfected, and aired, and should be left unused for *at least four weeks* (better two months) before clean sheep are placed in them;

(3) fields in which scabby sheep have been kept should stand vacant *at least four weeks* (better six or eight) before being used for clean sheep; (4) a drenching rain will frequently serve to disinfect a pasture, but it is well to whitewash the posts against which scabby sheep have rubbed. Even after observing the precautions here given it is not possible to absolutely guarantee that there will be no reinfection, but the probabilities are against it.

*Life history of the parasite.*—A study of the life history of the scab parasite is necessary in order to determine several important points of practical value, such as the proper time for the second dipping, etc.

The female mite lays about 15 to 24 eggs on the skin, or fastened to the wool near the skin; a six-legged larva is hatched; these larvæ cast their skin and become mature; the mites pair and the females lay their eggs, after which they die. The exact number of days required for each stage varies somewhat, according to the writings of different authors, a fact which is probably to be explained by individual variation, and by the conditions under which the observations and experiments were made. Thus Gerlach, in his well-known work (1857), estimates about fourteen to fifteen days as the period required for a generation of mites from the time of pairing to the maturity of the next generation. He divides this time as follows: Under ordinary conditions the eggs hatch in three to four days, although two authors allow ten to eleven days for the egg stage; three or four days after birth the six-legged larvæ moult and the fourth pair of legs appears; this fourth pair is always present when the mites are two-thirds the size of the adults; when 7 to 8 days old the mites are mature and ready to pair; several (three or four) days are allowed for pairing; another generation of eggs may be laid fourteen to fifteen days after the laying of the first generation of eggs. Without going into all of the other observations on these points, it may be remarked that the eggs may not hatch for six or seven days; the six-legged larvæ may moult when three to four days old, and become mature; after pairing a second moult takes place, lasting four to five days; a third moult follows immediately, then eggs are laid and the adults die; in some cases there is a fourth moult, but apparently without any further production of eggs. Accepting Gerlach's estimate of fifteen days as an average for each generation of 10 females and 5 males, in three months' time the sixth generation would appear and consist of about 1,000,000 females and 500,000 males.

Several practical lessons are to be drawn from these figures: First, it is seen that the parasites increase very rapidly, so that if scab is discovered in a flock, the diseased sheep should immediately be isolated; second, if new sheep are placed in a flock, they should either first be dipped, as a precautionary measure, or they should at least be kept separate for several weeks to see whether scab develops; third, since the chances for infection are very great, the entire flock should be treated, even in case scab is found only in one or two animals; fourth,

as dipping is not certain to kill the eggs, the sheep should be dipped a second time, the time being selected between the moment of the hatching of eggs and the moment the next generation of eggs is laid. As eggs may hatch between three and seven, possibly ten or eleven, days, and as fourteen to fifteen days are required for the entire cycle, the second dipping should take place after the seventh day, but before the fourteenth day; allowing for individual variation and variation of conditions, the tenth, eleventh, or twelfth day will be the best time to repeat the dipping.

(2) HEAD SCAB, BLACK MUZZLE, OR SARCOPTIC SCAB.

Head scab is less frequent and less important than body scab. No case of it has ever been reported by the inspectors of this Bureau, and many extensive sheep breeders and professional sheep dippers state that they have never heard of a case.

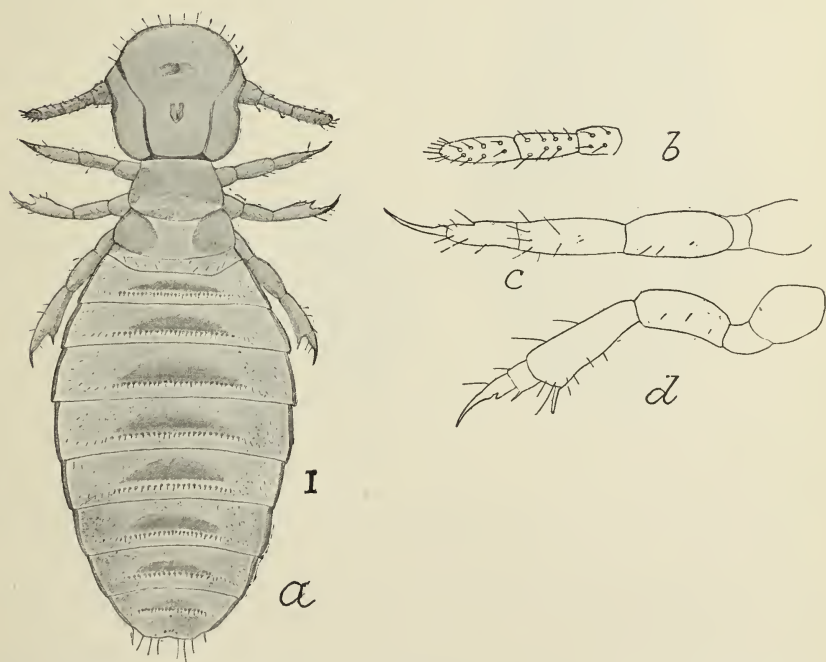


FIG. 3.—Sheep louse (*Trichocephalus sphaerocephalus*): a, female; b, antenna; c, d, dorsal and side view of leg. Enlarged. (After Osborn, 1896; Bul. No. 5, Div. Entomology, Dept. Agr.)

In this disease the parasites are much smaller than the psoropt of body scab. They are almost invisible to the naked eye, but may be seen with a magnifying glass. They are found on the moist under-surface of the crusts, and live on the fluids of the sheep. They give rise to a violent itching, causing the sheep to rub and scratch their heads and lick their lips; in advanced stages the eyes may be partly closed, and consequently the sight impaired; breathing and even eat-

ing may become difficult because of the formation of crusts around the mouth and nostrils. Small papules form, with soft centers; usually the rubbing causes them to break, and they exude a fluid which hardens and forms a scab; the scabs, increasing in number, may run together; they become thicker and harder, until almost the entire head is merged into one crust. Rubbing causes the crusts to break; the wounds heal and form scars; the skin thickens and is raised in folds, in which cracks appear and from which there may be bleeding. When affecting lambs the disease may assume an ulcerative character.

*Parts of body affected.*—This form of scab appears on parts of the body where the wool is scarce; usually beginning about the nostrils

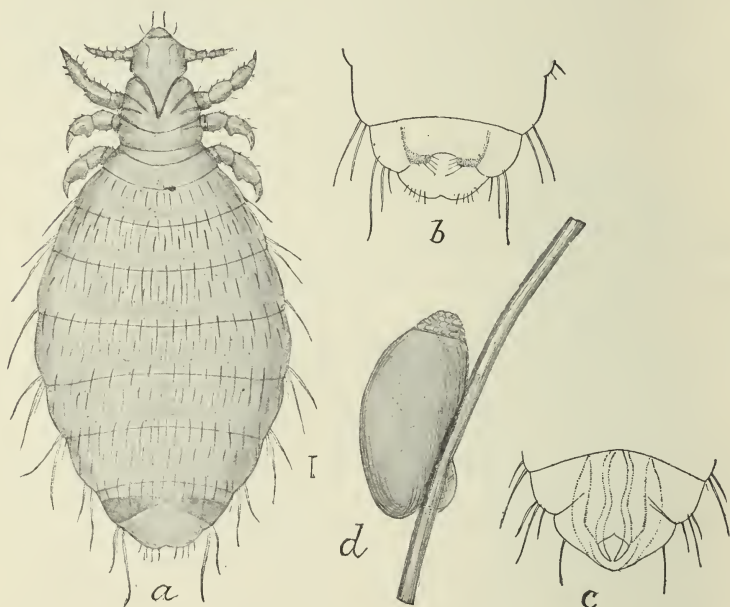


FIG. 4.—Sheep foot louse (*Haematopinus pedalis*): a, adult female; b, ventral view of terminal segment of same, showing brushes; c, terminal segments of male; d, egg. Enlarged. (After Osborn, 1896; Bul. No. 5, Div. Entomology, Dept. Agr.)

and on the upper lip, more rarely about the eyes and ears, it spreads to the cheeks, eyes, forehead, and under the jaws; in severe cases it may extend to the belly, front legs, knees, hocks, and pasterns. Coarse dry wool favors it more than fine oily wool. The line between the diseased and the healthy skin is quite sharply defined.

*Contagion.*—Head scab is contagious from sheep to sheep, from sheep to goats, and rarely from sheep to man; when transmitted from sheep to horses, cattle, and dogs the disease remains local and does not spread. Head scab is also contagious from goats to sheep. Viborg states that the sarcoptic scab of pigs is contagious to sheep, but this is denied by Am-Pach. Chabert maintained that sarcoptic scab of dogs is transmissible to sheep, but this is doubtful.



*Chances for recovery.*—Head scab can be easily treated if taken in time, but if neglected it will cause inflammation of the eyes and extensive alterations in the skin, and will prevent the sheep from fattening.

### (3) FOOT SCAB, OR CHORIOPTIC SCAB.

Foot scab is rare, if present at all, in this country, but a number of cases have recently been reported from England. It is not impossible that some of the cases supposed to be foot rot are in reality foot scab.

The minute parasites, which are much smaller than those of common scab, cause an intense itching, which leads the sheep to stamp their feet and scratch and bite the infected parts. There is a reddening of the skin, followed by scaling, and later by the formation of yellowish white crusts; the crusts thicken, cracks may form in the folds of the pasterns, and the legs may become quite unsightly.

*Parts of the body affected.*—The disease appears on the feet and legs, spreading slowly to the upper parts of the legs and the adjoining parts of the body, scrotum, or udder.

*Contagion.*—This disease is contagious from sheep to sheep, but not so actively as common scab.

### (4) FOLLICULAR SCAB, OR DEMODECTIC SCAB.

The glands of a sheep's eyelids are occasionally infected with a fourth kind of microscopic mite, which is elongate and much like a worm. It has been recorded but a few times, and for the present, at least, is of no importance to the American sheep raiser.

### CONDITIONS WHICH MAY BE MISTAKEN FOR SCAB.

Any parasite or condition which causes an itching, and thus leads the sheep to scratch themselves, or any abnormal condition of the skin, may be temporarily mistaken for scab; but if the rule is held in mind that no scab is possible without the presence of the specific parasites, it will be easily determined whether scab is present or not. The following are the more important cases to be considered:

(1) *Itching due to other parasites*, such as the common "sheep tick," true ticks, and lice, may be distinguished from scab by finding the parasites. The dipping used for treating scab will also kill sheep ticks and lice.

(2) *Inflammation of the sebaceous glands.*—This may be mistaken for common scab. It appears most frequently in autumn. There is a severe itching, the skin is red and sensitive, and is covered with a strong-smelling, yellowish, viscid yolk; tufts of wool may be shed. It may be cured, after shearing, with any starchy lotion.

(3) *Rain rot.*—In rainy weather an eruption may appear on the skin which might be mistaken for scab. There is, however, no parasite present; itching is absent, and the trouble disappears when dry weather comes.

## THE TREATMENT OF SCAB.

In the foregoing discussion attention has been called to the necessity of keeping sheep under proper hygienic conditions. That alone, though of importance in connection with the subject of treatment, can not be relied upon to cure scab. The only rational treatment consists in using some external application which will kill the parasites. Formerly medicines were given internally, and even within a few years past it has been claimed that feeding sulphur to sheep will cure the disease. The statements regarding sulphur were such as to lead us to try the experiment, which, however, was soon abandoned as unsuccessful. The external application of scab cures is in various ways made known as hand dressing, hand curing, spotting, pouring, smearing, and dipping. Of these methods, dipping is by far the most satisfactory.

## HAND APPLICATIONS.

In case of head scab, or in light cases of foot scab, hand applications may be resorted to, and will frequently suffice. A nonpoisonous ointment may be made by taking 4 ounces of oil of turpentine, 6 ounces of flowers of sulphur, and 1 pound of lard. Mix the ingredients at a gentle heat, and rub in well with the hands or with a brush, at the same time breaking the crusts. The simple sulphur ointment may be made of 1 part of sulphur and 4 parts of lard; one-fourth part of mercurial ointment may be added. Few remedies are so useful in mange in dogs, ringworm, and other itching complaints as sulphur iodide, and it may well be given a trial on head scab. It is prepared as follows: Mix in a nonmetallic vessel, as a porcelain mortar, 4 ounces of iodine with 1 ounce of sublimed sulphur, gently heating the mixture until it liquefies; the red-brown liquid upon cooling becomes a gray-black crystalline mass, insoluble in water, but soluble in glycerine and fats, with 8 or 10 parts of which it is mixed for ointments or liniments. An ointment of flowers of sulphur and carbolated vaseline would also probably give good results. One author advises for head scab and foot scab a mixture consisting of 1 part of mercurial ointment and 11 parts of sulphur ointment. Foot scab and head scab would also probably respond to treatment with the various dips used for common scab.

Hand dressing is not recommended for common scab; in fact, it must be looked upon as directly responsible for a considerable amount of the disease, since it is too often relied upon to cure the disease, while in reality it is only a palliative. The only condition under which hand dressings can be advised is in case scab is discovered in one or two sheep of a flock during severe winter weather, when dipping would be impracticable. In that event, the infected sheep should be immediately isolated from the flock; and they might be hand dressed, if desired, in order to hold the disease in check. It can not be too strongly insisted upon that "pouring," "spotting," etc., are only expensive and temporizing methods of dealing with scab.

"Pouring" is done as follows: Part the wool on the back by making a furrow with the finger from the head to the tail; furrows are also made along the shoulders and thighs to the legs, and on the sides; pour the ointment or dip in these furrows. A still better plan is to pour the warm dip from a coffeepot or teapot directly on the affected parts, rubbing it well in with the hand, a brush, or a corncob. It must be repeated for emphasis, however, that such treatment can not be relied upon, and should be used only in emergency cases when dipping is impracticable.

A mercurial ointment may be made as follows: (A) dissolve 1 pound of resin in one-half pint of oil of turpentine; (B) mix 1 pound of mercurial ointment with 6 pounds of lard, with gentle heat, and (C) when cool mix the two compounds, A and B. It should be remembered that mercurial ointments are not unattended with danger, and on this account it is better to prepare a small amount of dip and pour it on the affected part as described above.

#### DIPPING.

By far the most rational and satisfactory, and the cheapest method of curing scab is by dipping the sheep in some liquid which will kill the parasites. The dipping process is as follows:

(1) Select a dip containing sulphur. If a prepared "dip" is used which does not contain sulphur, it is always safer to add about 16½ pounds of sifted flowers of sulphur to every 100 gallons of water, especially if, after dipping, the sheep have to be returned to the old pastures.

(2) Shear all the sheep at one time, and immediately after shearing confine them to one-half the farm for two to four weeks. Many persons prefer to dip immediately after shearing.

(3) At the end of this time dip every sheep (and every goat also, if there are any on the farm).

(4) Ten days later dip the entire flock a second time.

(5) After the second dipping, place the flock on the portion of the farm from which they have been excluded during the previous four or five weeks.

(6) Use the dip at a temperature of 100° to 110° F.

(7) Keep each sheep in the dip for two minutes by the watch—do not guess at the time—and duck its head at least once.

(8) Be careful in dipping rams, as they are more likely to be overcome in the dip than are the ewes.

(9) Injury may, however, result to pregnant ewes, which must, on this account, be carefully handled. Some farmers arrange a stage, with sides, to hold the pregnant ewes, which is lowered carefully into the vat, and raised after the proper time.

(10) In case a patent or proprietary dip, especially an arsenical dip, is used, the directions given on the package should be carried out to the letter.

## CHOICE OF A PREPARATION FOR DIPPING.

Numerous different sheep dips are recommended by various parties, and undoubtedly many of them are efficacious; few dips can be named which some persons do not consider far superior, and other persons consider far inferior to all other dips known; few dips can be found which have not cured cases of scab, and probably no dip can be named with which failures have not been reported. Under these circumstances the farmer should not be deceived by exaggerated statements in either extreme; he should recall that it lies in the business interest of the manufacturers of every proprietary, or patent, dip to advertise their own particular dip in every way possible, but that too often these merchants pursue the method of deprecating the use of homemade dips as "dangerous," "ineffective," "liable to produce blood poisoning," etc., and of citing the accidents, failures, and dangers of other proprietary dips rather than of giving exact and reliable statements regarding the successes of their own compounds.

## PROPRIETARY ARTICLES.

The Department can not properly advertise or recommend the use of any dip which is made from a secret formula. It can not be said that no such dip has any value as a scab cure, or that such dips have never met with any success, for that would be a misrepresentation of facts. The farmer should, however, know the composition of the material he is using. If he desires to use a ready-made dip, let him inform himself of the exact nature of that dip in order to prevent impositions and guard against dangers. He would do well to refuse to purchase any prepared dip which does not bear on each package a printed statement of the ingredients and their proportions, which the manufacturer guarantees are to be found in that package; he would also do well to avoid any dip which irresponsible parties advertise as "the only sure cure for scab," etc. Proprietors thus advertising are either showing gross ignorance of the history and nature of scab, and hence are not to be taken as advisers, or they are intentionally misrepresenting established facts.

In case of more than one proprietary dip, it seems quite clear from the circulars and advertisements distributed by the manufacturers that the firms have had little or no practical experience with scab, and that the extravagant claims set forth by them for their mixtures are little less than artful methods of advertising, rather than statements based upon any tests or experiments. Good examples of worthless or almost worthless dips are cited by Bruce, who quotes the treatment of 80,021 cases of scab with *Allen's Specific*, with not a single case of cure! *Hayes's Specific* cured 6,255 cases and failed in 80,931 cases!

## SUCCESS WITH HOMEMADE DIPS.

While a dip should not be condemned simply because it is prepared ready for use—for it may be frankly admitted that there are some excel-



lent proprietary dips—the value of homemade dips must be insisted upon, and attention is called to the fact that it was almost entirely through homemade dips that scab was eradicated from certain of the Australian colonies, and that year after year, in the reports of the scab inspectors of Capetown Colony, the first and third places are accorded to homemade dips, while second place is accorded (with some qualification) to a secret dip. In this connection the following significant remarks, made in 1892 by the chief inspector of stock in Queensland, will be of interest:

Our Australian experience of tobacco and sulphur and of lime and sulphur as the only effectual means of curing scab is such that at the stock conference held in Sydney in 1886, and again in Melbourne in 1889, attended by the chief and Government veterinarians of all the colonies, it was on both occasions decided that none but these two dips be recognized in the colonies, and this has now been embodied in regulations under the “Stock disease acts” of all the colonies.

The stamping out of scab in these colonies has been more retarded by vendors of patent dips than by any other cause; hence the determination of the governments of all the colonies to forbid the use of any specific except tobacco and sulphur or lime and sulphur for scab or for the (precautionary) dressing of imported sheep while in quarantine.

In view of the more or less frequent statements that scab was eradicated from the English colonies by killing the scabby sheep or by the use of prepared dips it may be well to say that these statements are erroneous. “It is true an act was passed in New South Wales about 1851 compelling the slaughter of scabbed sheep, and a few remaining straggling flocks were destroyed under that act, but later, on the reappearance of scab in that colony in 1863 by infection from Victoria, the act was repealed, and the whole of the scabbed sheep, about 400,000, were completely cured by means of tobacco and sulphur.”<sup>1</sup>

#### IMPORTANCE OF PROPER USE OF DIP.

Whatever dip is selected, the farmer should not forget that there are two ways to use that dip. One way is to prepare and use it in accordance with the directions given; the other way is to attempt to economize time, labor, or money by using the dip in weaker proportion than advised, by hurrying the sheep through the swim, or by later placing the dipped sheep under unfavorable conditions. If the former method is adopted with any of the established dips, the treatment ought to be followed with favorable results; if the latter method is adopted, the farmer himself must assume the responsibility of failure, no matter which dip he decides to use. Every farmer should therefore remember that when he has decided upon the dip he is to use his work has only begun; to use the dip properly is fully as important as to use a dip at all.

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<sup>1</sup> Statement made by P. A. Gordon, chief inspector of stock, Queensland.

## PRELIMINARY QUESTIONS IN CHOOSING A DIP.

The homemade dips which are most commonly used have either tobacco or sulphur as their basis, while the prepared dips contain tobacco, sulphur, arsenic, carbolic acid, etc., as curative agents.

In selecting a dip several points should be considered: First of all, the question of expense will naturally arise; next, the question as to whether or not scab actually exists in the flock to be dipped, or whether or not the dipping is more of a precautionary matter, or for the sake of cleansing the animal's skin. The facilities at hand, the setback to the sheep, and the length of the wool are also matters for consideration, as well as the pastures into which the dipped sheep are to be placed. Notwithstanding statements to the effect that a given dip can be used under all conditions, the above questions are evidently important.

*Expense.*—In estimating the expense one should consider not only the actual outlay for the ingredients of the ooze, but the cost of fuel and labor, the injury, if any, to the sheep, and the liability of not curing the disease. It is much more economical to use an expensive dip and cure scab than it is to use a cheap dip and fail to cure it. To illustrate with a well-known homemade dip: A lime-and-sulphur dip may be made in ten to thirty minutes, with but little fuel and little labor, which may or may not cure the disease, and which will surely do great injury to the wool; or a lime-and-sulphur dip may be made in several hours' time, at the expense of considerable fuel, labor, and patience, which can be relied upon to cure scab, and which will do little or no injury to the wool. The first dip is cheap, but not economical; the second dip is more expensive, but more economical.

*Does scab exist in the flock?*—Every farmer should ask himself this question before he selects his dip. If scab does not actually exist and the wool is long, the dipping in this case simply being a matter of precaution, it is best not to select a dip containing lime. The use of the lime-and-sulphur dips is therefore not advised simply as precautionary dressing for healthy long-wooled sheep. On the contrary, the use of any dip containing lime, as a precautionary measure, should be avoided.

*The facilities at hand for preparing dip.*—If fuel is very scarce, so that it is impracticable to boil the mixture for at least two hours, the lime-and-sulphur dips should not be selected. A tobacco-and-sulphur dip, as well as many of the better proprietary dips, can be made without the necessity of lengthy boiling, and should be given preference whenever facilities for boiling are not at hand.

*The length of the wool.*—See remarks upon this subject in discussion of lime and sulphur, page 26.

*The pastures.*—In case it is necessary to place the dipped sheep on the same pastures they occupied before being dipped, it is always best to use a dip containing sulphur. If a proprietary dip is selected under those circumstances, it is suggested that sulphur be added, about 1 pound of flowers of sulphur to every 6 gallons of dip. In case it is

possible to utilize fresh pastures after dipping, the use of sulphur is not so necessary, but is always advisable. The object in using sulphur is to place in the wool a material which will not evaporate quickly, but will remain there for a longer period of time than the scab parasites ordinarily remain alive away from their hosts. By doing this the sheep are protected against reinfection.

#### KINDS OF DIPS.

Sulphur is one of the oldest known remedies for scab, its use dating back to Columella in the early part of the Christian era. As a scab eradicator, it must be placed among the best substances at our disposal. It is one of the constituents of certain proprietary dips, but its use to the farmer is best known in the tobacco-and-sulphur dip and in the lime-and-sulphur dip. These homemade mixtures are the two dips which have played the most important rôles in the eradication of scab from certain English colonies, and their use, especially the use *as well as the abuse* of lime and sulphur, is quite extensive in this country.

#### THE TOBACCO-AND-SULPHUR DIP.

The formula, as given here and as adopted by the New South Wales sanitary authorities, appears to have first been proposed in 1854 by Mr. John Rutherford. Regarding its success in Australia, Dr. Bruce, chief inspector of sheep for New South Wales, makes the following statements:

On the Hopkins Hill Station Mr. Rutherford, with two dressings of these ingredients, then cured over 52,000 sheep which had been infected for eighteen months; and he also subsequently cured with two dippings the sheep on Mount Fyans Station, where they were in a most wretched state, and had been scabby for more than three years, and that, too, in both cases, without destroying a single hurdle or yard or removing any of the sheep from their old runs.

Since then millions of scabby sheep have been permanently cured in Victoria in the same way, and in South Australia and New South Wales hundreds of thousands of scabby sheep have also been cleansed with tobacco and sulphur. In fact, this dressing has the credit of having eradicated scab from the flocks of both the latter colonies, and there are good grounds for asserting that had this remedy not been known and used neither colony would be, as they both are now, almost entirely free from the scourge. Judging therefore from the experience of the three colonies, there is no medicament or specific yet known [1884] that can be compared with tobacco and sulphur as a thorough and lasting cure for scab in sheep.

The proportions adopted by Rutherford, and afterwards made official by the scab sanitary authorities, are:

Tobacco leaves.....	pound..	1
Flowers of sulphur .....	do....	1
Water .....	gallons..	<sup>1</sup> 6

The advantage of this dip lies in the fact that two of the best scab remedies, namely, tobacco (nicotine) and sulphur, are used together,

<sup>1</sup> The original formula reads 5 gallons (imperial) which are equivalent to 6 United States gallons.

both of which kill the parasites, while the sulphur remains in the wool and protects for sometime against reinfection. As no caustic is used to soften the scab, heat must be relied on to penetrate the crusts.

*Directions for preparing the dip.*—A. Infusing the tobacco: Place 1 pound of good leaf or manufactured tobacco for every 6 gallons of dip desired in a covered boiler of cold or lukewarm water and allow to stand for about twenty-four hours; on the evening before dipping bring the water to near the boiling point (212° F.) for an instant, then remove the fire and allow the infusion to stand over night.

B. Thoroughly mix the sulphur (1 pound to every 6 gallons of dip desired) with the hand in a bucket of water to the consistency of gruel.

C. When ready to dip, thoroughly strain the tobacco infusion (A) from the leaves by pressure, mix the liquid with the sulphur gruel (B), add enough water to make the required amount of dip and thoroughly stir the entire mixture.

All things considered, the tobacco-and-sulphur is as good a dip as is known at the present time.

See also the discussion of the tobacco dip on page 30.

#### LIME-AND-SULPHUR DIPS.

Under the term "lime-and-sulphur dips" is included a large number of different formulæ requiring lime and sulphur in different proportions. In general practice all of these dips are spoken of as "the lime-and-sulphur dip," but in reality each separate formula represents a separate dip.

To give an idea of the variety of the lime-and-sulphur dips, the following list is quoted, the ingredients being reduced in all cases to avoirdupois pounds and United States gallons:

1. The original "Victorian lime-and-sulphur dip" proposed by Dr. Rowe, adopted as official in Australia:

Flowers of sulphur .....	pounds..	20 $\frac{5}{8}$
Fresh slaked lime.....	do....	10 $\frac{5}{12}$
Water .....	gallons..	100

2. South African (Cape Town) official lime-and-sulphur dip:

Flowers of sulphur (minimum).....	pounds..	15
Unslaked lime.....	do....	15
Water .....	gallons..	100

3. South African (Cape Town) official lime-and-sulphur dip, February 4, 1897:

Flowers of sulphur.....	pounds..	20 $\frac{5}{8}$
Unslaked lime.....	do....	16 $\frac{3}{8}$
Water .....	gallons..	100

4. Nevada lime-and-sulphur dip:

Flowers of sulphur.....	pounds..	16 $\frac{3}{8}$
Lime.....	do....	33 $\frac{1}{8}$
Water .....	gallons..	100



## 5. Fort Collins lime-and-sulphur dip:

Flowers of sulphur .....	pounds..	33
Unslaked lime .....	do....	11
Water .....	gallons..	100

6. A mixture which, used to some extent by this Bureau, contains the same proportions of lime and sulphur (namely, 1 to 3) as the Fort Collins dip, but the quantities are reduced to:

Flowers of sulphur .....	pounds..	24
Unslaked lime .....	do....	8
Water .....	gallons..	100

*Dangerous formulæ.*

## 7. California lime-and-sulphur dip:

Flowers of sulphur .....	pounds..	100
Lime .....	do....	25
Water .....	gallons..	100

8. A very dangerous misprinted formula to be found in several books and journals, probably due to a typographical error:

Flowers of sulphur .....	pounds..	100
Lime .....	do....	150
Water .....	gallons..	100

In case of fresh scab formula No. 6 will act as efficaciously as the dips with a greater amount of lime, but in cases of very hard scab a stronger dip, as the Fort Collins dip, should be preferred, or, in unusually severe cases, an ooze with more lime in proportion to the amount of sulphur, such as the Victorian (No. 1), the Nevada (No. 4), or the South African (No. 3) dip might be used.

Many other formulæ might be cited, but these are enough to show the great variations in the dips which have been used; and to prove that when a party simply states that "lime and sulphur" is an excellent dip, or that it is a dangerous dip, or that he has succeeded or failed with it, or that the lime-and-sulphur dip is injurious to the wool, his statements can not be taken as definite, unless he also states which lime-and-sulphur dip he used and how he used it.

*Prejudice against lime-and-sulphur dips.*

There is at present great prejudice (a certain amount of it justified no doubt) against the use of lime and sulphur, emanating chiefly from the agents of patent or proprietary dips and from the wool manufacturers. It will be well therefore to consider the points brought forward by them against its use.

In the first place, it is frequently asserted that lime and sulphur does not cure scab. This statement is, of course, in the interest of proprietary dips, but it is based either upon an absolute ignorance or a misrepresentation of facts. Experience in Australia and South Africa, as well as in this country, has shown beyond any doubt that a lime-and-sulphur dip, when properly proportioned, properly prepared, and properly used, is one of the best scab eradicators known. Cases of its

failure have been due to careless or improper methods of its preparation and use.

It is claimed by some that it produces "blood-poisoning." But the cases of death following the use of lime-and-sulphur dips have been infinitesimally few when compared with the number of sheep dipped in these solutions and when compared with the deaths which have been known to follow the use of certain proprietary dips. The details of such accidents so far as they have been reported have not shown that death was due to any properly prepared and properly used lime and-sulphur dip. If the formula of 100 pounds of sulphur, 150 pounds of lime, and 100 gallons of water has killed animals, that surely is no argument against the formula 33 pounds of sulphur, 11 pounds of lime, and 100 gallons of water, but simply shows that the former formula is too strong; if any other conclusion than this is drawn, consistency would compel us to reject many of our most valuable remedies because some parties had used them in overdose. The argument frequently raised against lime and sulphur—namely, that "shear-cut" sheep die when dipped immediately after shearing in a lime-and-sulphur dip which has stood for some time—can be used equally well against other dips, and simply shows that it is safer to use a fresh supply of dip and to allow a short time to elapse after shearing before dipping. It is highly probable that the cases of so-called "blood-poisoning" of shear-cut sheep are generally due to an infection with bacteria in stale dip containing putrefying material. Some cases of death are also said to have occurred after using a lime-and-sulphur dip made in brass kettles.

In an experiment by this Bureau, 5 cc. of a clear lime-and-sulphur ooze (Formula No. 6) has been injected under the skin of a sheep without producing any evil effects.

The greatest objection raised against the use of lime-and-sulphur dip is that it injures the wool. This objection is raised by many wool manufacturers, and echoed with ever-increasing emphasis by the manufacturers of prepared dips; while, after years of extensive experience with properly prepared dip, its injury to the wool is strongly and steadfastly denied by the agricultural department of Cape Colony.

It is believed that a certain amount of justice is attached to this objection to lime and sulphur as generally used; unless, therefore, lime and sulphur can be used in a way which will not injure the wool to an appreciable extent, we should advise against its use in certain cases; in certain other cases the good accomplished far outweighs the injury it does. Let us, therefore, examine into this damage and its causes.

The usual time for dipping sheep is shortly after shearing, when the wool is very short; whatever the damage at this time, then, it can be only slight, and the small amount of lime left in the wool will surely do but little harm.

In full fleece, lime and sulphur will cause more injury. In Australia the deterioration was computed by wool buyers at 17 per cent, although in Cape Colony the department of agriculture maintains that if prop-

erly prepared, and if only the clear liquid is used, the sediment being thrown away, the official lime-and-sulphur formula will not injure the long wool. In our own experiments we have found some samples of wool injured by dipping, while on other samples no appreciable effect was noticeable.

It must not be forgotten that other conditions, such as variations in the feed, pasturing on alkaline land, ill health from any cause, etc., may cause brittleness of the wool, which might be mistaken for the effects of lime and sulphur.

If a lime-and-sulphur dip is used, care must be taken to give the solution ample time to settle, then only the clear liquid should be used, while the sediment should be discarded. In some of our tests on samples of wool we have found that the dip with sediment has produced very serious effects even when no appreciable effects were noticed on samples dipped in the corresponding clear liquid.

Experience has amply demonstrated that a properly made and properly used lime-and-sulphur dip is one of the cheapest and most efficient scab eradicators known, but its use should be confined to flocks in which scab is known to exist, and to shorn sheep, with the exception of very severe cases of scab in unshorn sheep. It should only be used when it can be properly boiled and settled. The use of lime-and-sulphur dips in flocks not known to have scab, especially if the sheep are full fleeced, can not be recommended; in such cases tobacco, or sulphur and tobacco, is safer and equally good.

If a lime-and-sulphur dip is chosen, it is better for ordinary cases to use the solutions containing a small amount of lime and three times as much sulphur as lime, as the Fort Collins formula (33 pounds of sulphur and 11 pounds of lime to every 100 gallons of water) or the Bureau of Animal Industry formula (No. 6) (24 pounds of sulphur and 8 pounds of lime to 100 gallons of water), rather than the formula with a greater proportion of lime.

If the stronger solutions, as the Victorian formula (No. 1), or the present South African formula (No. 3), or the Nevada formula (No. 4) are used at all, their use should be confined to unusually severe outbreaks. Under no circumstances should the Californian formula (No. 7) or formula No. 8 be used. They are too strong, and the latter is especially liable to kill the sheep.

Another objection raised to the use of lime and sulphur is the claim that the "shrinkage" in the sheep after the use of these dips is greater than after the use of other dips. In reply to this objection, raised chiefly by patent-dip manufacturers, it can only be repeated that such has not been the experience of this Bureau (see p. 35), nor was it the experience of Professor Gillette in his experiments in Colorado. The burden of proof for the opposite statement, with exact statistics, rests upon those who raise this objection.

Still another objection advanced against lime and sulphur is that its continued use year after year will gradually decrease the annual

dip. Whether this objection be valid or not, it is scarcely necessary to discuss it in detail in this place; for, in the first place, the average sheep raiser of this country does not keep the same sheep "year after year," but sends most of his sheep (breeding ewes and the rams excepted) to market. Hence there will usually be little opportunity to injure the wool of a given animal "year after year." In the next place, if lime and sulphur are properly used one year, so that the flock is freed from scab and if reinfection be guarded against, it will not be necessary to resort again to lime and sulphur.

These objections have been reviewed somewhat in detail in order to place the facts, so far as obtainable, before the farmer. It is not particularly advised by the Bureau that lime and sulphur be used in this country in preference to sulphur and tobacco, or tobacco alone, or any other effective dip. In fact, it is hoped that within ten years there will be no further use for the lime-and-sulphur dips. At the same time, where it is a choice, on the one hand, between lime and sulphur, with a temporary slight deterioration in the value of wool, but an absence of scab, and, on the other hand, the use of a secret and ineffective patent dip, with the continual presence of scab, and hence permanent deterioration in wool, there can be no doubt that the decision should be in favor of lime and sulphur (properly prepared and properly used).

All things considered, where it is a choice between sacrificing the weight of sheep, and to some extent the color of the wool, by using tobacco and sulphur, and sacrificing the staple of the wool by using lime and sulphur, the farmer should not hesitate an instant in selecting tobacco in preference to lime. The loss in weight by using tobacco and sulphur is not much greater than the loss in using lime and sulphur, while the loss in staple is of more importance than a slight discoloration.

*Preparation of the mixture.*—Almost as many different methods of preparing the liquid exist as there are different formulae, some of the methods laying great stress upon sifting both the lime and the sulphur, others laying great stress upon allowing the liquid to settle, others leaving out of consideration both of these points. The method which has been found in the Bureau to be the easiest and most satisfactory is as follows:

A. Take 8 to 11 pounds of unslaked lime, place it in a mortar box or a kettle or pail of some kind, and add enough water to slake the lime and form a "lime paste" or "lime putty."<sup>1</sup>

B. Sift into this lime paste three times as many pounds of flowers of sulphur as used of lime, and stir the mixture well.

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<sup>1</sup> Many persons prefer to slake the lime to a powder, which is to be sifted and mixed with sifted sulphur. One pint of water will slake three pounds of lime if the slaking is performed slowly and carefully. As a rule, however, it is necessary to use more water. This method takes more time and requires more work than the one given above, and does not give any better results. If the boiled solution is allowed to settle the ooze will be equally as safe.



Be sure to weigh both the lime and the sulphur. Do not trust to measuring them in a bucket or to guessing at the weight.

C. Place the sulphur-lime paste in a kettle or boiler with about 25 to 30 gallons of boiling water, and boil the mixture for two hours at least, stirring the liquid and sediment. The boiling should be continued until the sulphur disappears, or almost disappears, from the surface; the solution is then of a chocolate or liver color. The longer the solution boils the more the sulphur is dissolved, and the less caustic the ooze becomes. Most writers advise boiling from thirty to forty minutes, but we obtain a much better ooze by boiling from two to three hours, adding water when necessary.

D. Pour the mixture and sediment into a tub or barrel placed near the dipping vat and provided with a bunghole about four inches from the bottom and allow ample time (two to three hours, or more if necessary) to settle.

The use of some sort of settling tank provided with a bunghole is an absolute necessity, unless the boiler is so arranged that it may be used both for boiling and settling. An ordinary kerosene oil barrel will answer very well as a small settling tank. To insert a spigot about three to four inches from the bottom is an easy matter. Draining off the liquid through a spigot has the great advantage over dipping it out in that less commotion occurs in the liquid, which therefore remains freer from sediment.

E. When fully settled, draw off the clear liquid into the dipping vat and add enough warm water to make 100 gallons. The sediment in the barrel may then be mixed with water and used as a disinfectant, *but under no circumstances should it be used for dipping purposes.*

A double precaution against allowing the sediment to enter the vat is to strain the liquid through ordinary bagging as it is drawn from the barrel.

In watching the preparation of lime-and-sulphur dips by other parties the Bureau investigators have found some persons who laid great stress upon stirring the sediment well with the liquid before using the ooze. This custom is undoubtedly responsible for a great deal of the prejudice which exists at present against lime-and sulphur dips; and considering the preparation of these dips in this way there is no wonder at the immense prejudice against them in certain quarters.

To summarize the position of the Department on the lime-and-sulphur dips: When properly made and properly used, these dips are second to none and equaled by few as scab eradicators. There is always some injury to the wool resulting from the use of these dips, but when properly made and properly used upon shorn sheep it is believed that this injury is so slight that it need not be considered; on long wool the injury is greater and seems to vary with different wools, being greater on a fine than on a coarse wool. This injury consists chiefly in a change in the microscopic structure of the fiber, caused by the caustic action of the ooze. When improperly made and improperly used the lime-and-sulphur dips are both injurious and dangerous, and

in these cases the cheapness of the ingredients does not justify their use. In case scab exists in a flock and the farmer wishes to eradicate it, he can not choose a dip which will bring about a more thorough cure than will lime and sulphur (properly made and properly used), although it will be perfectly possible for the farmer to find several other dips which will, when properly used, be nearly or equally as effectual as any lime-and-sulphur dip. There is no dip to which objections can not be raised.

#### POTASSIUM SULPHIDE DIP.

It has been proposed by several parties to use a potassium sulphide dip, and such a dip has been tried to some extent. As yet, however, judgment upon it must be reserved. Gillette tried a dip composed of  $4\frac{1}{2}$  pounds of potash lye, 16 pounds of flowers of sulphur, and 100 gallons of water, and promises further reports on its effectiveness. Sheep dipped in this liquid gained but 6 pounds, namely, the same as the sheep treated with carbolic dip.

#### TOBACCO DIPS.

The active principle of tobacco, upon which the tobacco dips depend for their action, is a poisonous substance known as nicotine. This poison when applied to animals externally in too strong solutions may cause nausea, fainting, and even death. The dog and the rabbit are particularly susceptible to its effects. Diluted to about thirty-three one-thousandths to sixty one-thousandths of 1 per cent it makes a slow but sure-acting and excellent sheep dip.

Unfortunately the percentage of nicotine varies greatly, not only in different kinds of tobacco, but also in different parts of the plant, in different years, and even in different parts of the same package. There is more nicotine in the leaves, for instance, than in the stems. In fermented tobacco there seems to be a certain relation between the amount of nicotine and the amount of juice present, so that in general dry, thin leaves do not contain so much nicotine as thick, "fat" leaves. The variation in percentage of nicotine in different kinds of tobacco may be seen from the following table of determinations taken from Kissling, 1893:

*Statement giving the name of tobacco and amount of nicotine in percentage of dry substance.*

	<i>Per cent.</i>		<i>Per cent.</i>
Virginia .....	4.80	Brazil.....	1.14
Virginia .....	4.30	Turkish.....	2.51
Kentucky .....	4.50	Elsace .....	1.91
Sumatra .....	4.10	Elsace .....	0.92
Seedleaf.....	3.70	Maryland .....	1.26
Seedleaf.....	3.00	Maryland scrubs .....	1.17
Havana .....	3.00	Carman .....	1.18
Havana .....	1.90	Ohio Bay.....	1.06
Brazil.....	2.78	Ambalrma.....	1.17
Brazil Felix.....	2.73	Domingo .....	0.82
Brazil Felix.....	1.25	Ohio .....	0.68
Java .....	2.61		

In four carloads of stems, aggregating 127,273 pounds, one American firm extracted 1,405.43 pounds of nicotine, or 1.104 per cent.

While the above figures represent the percentages extracted in the chemical and manufacturing laboratories, they do not necessarily represent the amount which the farmer would be able to extract with the methods and apparatus at his disposal. On account of the variation in the amount of nicotine in the different samples of tobacco, it is practically impossible for the farmer to make up an exact desired strength of tobacco dip if he prepares his own mixture from the leaves. He can, however, prepare a mixture which will come within the limits necessary to kill the scab parasites. If a solution of an exact given strength is desired, it will be necessary to buy prepared nicotine, or prepared tobacco dips of a guaranteed strength and reduce them to the strength determined upon.

To prepare the tobacco dip from the leaves, it is best to use at least 21 pounds of leaves to every 100 gallons of water. Assuming that a tobacco leaf is used from which the farmer might extract 2 per cent of nicotine, the 100 gallons of ooze would contain slightly more than five hundredths of 1 per cent; to obtain 100 gallons of ooze of thirty-three one-thousandths of 1 per cent strength, it would be necessary to use 21 pounds of tobacco yielding nearly 1.3 per cent nicotine.

*Directions for preparing the dip.*—For every 100 gallons of dip desired, take 21 pounds of good prepared tobacco leaves; soak the leaves in cold or lukewarm water for twenty-four hours in a covered pot or kettle; then bring the water to near the boiling point for a moment and, if in the morning, allow the infusion to draw for an hour; if in the evening, allow it to draw over night; the liquid is next strained (pressure being used to extract as much nicotine as possible from the wet leaves) and diluted to 100 gallons per 21 pounds of tobacco. This dip should be used as fresh as possible as it contains a large amount of organic material which will soon decompose.

The proportions here given, 21 pounds of prepared tobacco leaves to 100 gallons of water, have given very satisfactory results, especially in Cape Town colony, where the reports of the scab inspectors accord this homemade tobacco dip third place among the dips officially recognized. In regard to one of the proprietary tobacco dips the Cape Town agricultural department reports as follows: "Highly spoken of by several inspectors. Very efficacious, and improves the quality of the wool, making it soft and pliable. The one thing which militates against its general use is its expense, hindering the poorer farmers from using it. It is allowed to be one, if not the best, of the patent dips in use, and also the safest." By all means the use of a tobacco dip, or of the tobacco-and-sulphur dip, in preference to the lime-and-sulphur dips is advised in case the sheep to be dipped show no unmistakable signs of scab.

The advantages of the tobacco dip are that it is comparatively cheap,

since the farmer can grow his own tobacco; that it is effectual and at the same time not injurious to the wool. The disadvantages of the dip are that it sometimes sickens the sheep; that it also occasionally sickens the persons who use it, especially if they are not smokers; it spoils very rapidly; it causes a greater setback than lime and sulphur, but less of a setback than carbolic dips.

#### ARSENICAL DIPS.

There are both homemade arsenical dips and secret proprietary arsenical dips. It is well to use special precautions with both because of the danger connected with them. One of the prominent manufacturers of dips, a firm which places on the market both a powder arsenical dip and a liquid nonpoisonous dip, recently summarized the evils of arsenical dips in the following remarkable manner:

The drawbacks to the use of arsenic may be summed up somewhat as follows: (a) Its danger as a deadly poison. (b) Its drying effect on the wool. (c) Its weakening of the fiber of the wool in one particular part near the skin, where it comes in contact with the tender wool roots at the time of dipping. (d) Its not feeding the wool or stimulating the growth, or increasing the weight of the fleece, as good oleaginous dips do. (e) The danger arising from the sheep pasturing, after coming out of the bath, where the wash may possibly have dripped from the fleece, or where showers of rain, after the dipping, have washed the dip out of the fleece upon the pasture. (f) Its occasionally throwing sheep off their feed for a few days after dipping, and so prejudicing the condition of the sheep. (g) Its frequent effect upon the skin of the sheep, causing excoriation, blistering, and hardness, which stiffen and injure the animal, sometimes resulting in death.

Although this manufacturer has gone further in his attack upon arsenic than this Bureau would have been inclined to do, it must be remarked that when a manufacturer of such a dip can not speak more highly of the chief ingredient of his compound than this one has done in the above quotation, his remarks tend to discredit dips based upon that ingredient. It might be added that Bruce, the chief inspector of live stock for New South Wales, pays his respects to arsenical dips with the statement, "Arsenic and arsenic and tobacco (with fresh runs) cured 9,284 and failed with 9,271."

It may be said, on the other hand, that arsenic really has excellent scab-curing qualities; it enters into the composition of a number of the secret dipping powders and forms the chief ingredient in one of the oldest secret dips used. This particular dip has been given second place (with some qualifications) among the officially recognized dips in South Africa. In deference to the opinion of those who prefer an arsenical dip several formulæ are quoted here.

*Formulæ for arsenical dips.*—Finlay Dun recommends the following: Take 3 pounds each of arsenic, soda ash (impure sodium carbonate) or pearl ash (impure potassium carbonate), soft soap, and sulphur. A pint or two of naphtha may be added if desired. The ingredients are best dissolved in 10 to 20 gallons of boiling water and cold water is



added to make up <sup>1</sup>120 gallons. The head of the sheep must, of course, be kept out of the bath.

A mixture highly indorsed by certain parties consists of the following ingredients:

Commercially pure arsenite of soda .....	pounds..	14
Ground roll sulphur .....	do.....	34½
Water.....	gallons (U. S.)..	432

The arsenite of soda is thoroughly mixed with the sulphur before being added to the water.

*Precautions in use of arsenical mixtures.*—Any person using an arsenical dip should bear in mind that he is dealing with a deadly poison. The following precautions should be observed:

(1) Yards into which newly dipped sheep are to be turned should first be cleared of all green food, hay, and even fresh litter; if perfectly empty they are still safer. (2) When the dipping is finished, the yard should be cleaned, washed, and swept, and any unused ooze should at once be poured down a drain which will not contaminate food or premises used by any animals. (3) Dipped sheep should remain in an open, exposed place, as on dry ground. (4) Overcrowding should be avoided, and every facility given for rapid drying, which is greatly facilitated by selecting fine, clear, dry weather for dipping. (5) On no account should sheep be returned to their grazings until they are dry and all risk of dripping is passed.

*Suggestion as to danger.*—The formulæ given above are copied from the writings of men who have had wide experience in dipping, but this Bureau assumes no responsibility for the efficacy of the dips given or for their correct proportions. Furthermore, as long as efficacious non-poisonous dips are to be had, we see no necessity for running the risks attendant upon the use of poisonous dips.

#### CARBOLIC DIPS.

A carbolie-acid dip may be made at home or may be purchased as a proprietary article. This class of dips kills the scab mites very quickly, but unfortunately the wash soon leaves the sheep, which is consequently not protected from reinfection in the pastures. If, therefore, a carbolie dip is selected, it is well to add flowers of sulphur (1 pound to every 6 gallons) as a protection against reinfection.

The advantages of carbolie dips are that they act more rapidly than the tobacco or sulphur dips, and that the prepared carbolie dips are very easily mixed in the bath. They also seem, according to Gillette, to have a greater effect on the eggs of the parasites than either the sulphur or the tobacco dips. The great disadvantages of this class of dips are, first in some of the proprietary dips, that the farmer is uncertain regarding the strength of material he is using; second, the sheep

<sup>1</sup> The original formula reads 100 (imperial) gallons, which equal 120 United States gallons.

receive a greater setback than they do with either lime and sulphur or tobacco.

Gillette reports most excellent results from the use of a certain prepared carbolic dip. The Bureau purchased the same dip upon the open market and tested its effects upon the sheep in the proportion recommended by the manufacturer on the label of the package and also in one-half and one-third that strength. In the first and second tests the dip was severe both on the sheep and on the operators. In one case it caused a considerable, though temporary, eruption on the hands and arms of an operator. In all three cases the dipped sheep were almost overcome in the dipping tank, and upon recovering themselves ran around the field in an excited manner, bleating loudly and shaking their heads and tails. The eyes were more congested than we have ever seen them to be after a lime-and-sulphur or a tobacco dip.

An objection to some of the proprietary carbolic dips is that the manufacturers themselves apparently are little acquainted with their own mixtures. Their claims are extravagant and their directions often contradictory. It may be admitted that the carbolic dips are promising and that they may have a brilliant future, but they have not had a very brilliant past, and this Bureau is inclined to be extremely conservative in regard to them and to advise their manufacturers to prepare them in a guaranteed strength with more explicit directions for use than are to be found in the present circulars. The dip just referred to was certainly more severe in its effects on the sheep than can be justified by its quick action in killing the scab parasites, considering that other equally effective but milder solutions are to be had.

We also found in our tests (which are not yet fully completed) that the sheep have gained less in weight when dipped in certain two of these washes than when dipped in lime and sulphur, or in sulphur and tobacco, or in tobacco.

If a carbolic dip is used care must be taken that the ingredients form a thorough emulsion; if a scum arises to the top, a softer water should be used.

In justice to this class of dips it is only fair to state that while the views here expressed are entirely in accord with the opinions of some authorities, they do not agree with the views held by others; but they are based upon the material purchased in open market, and probably represent the experience of many who have used these dips. The investigations of the Bureau certainly show that more tests are necessary before this class of dips can be indorsed. It is hoped that these tests may be made in the near future.

One of the prominent proprietary carbolic dips was formerly recognized as one of the three official dips in New South Wales, but it has now been stricken from the list. In Cape Town carbolic dips are not much used, and in the official reports little is said concerning them.

## SETBACK TO THE SHEEP FROM DIPPING.

Dipping often results in a slight setback. If sheep are weighed immediately before dipping, and again at the same hour the following day, it will be noticed that the weight has changed. There may be a gain, but usually there is a loss varying from  $\frac{1}{2}$  to  $3\frac{1}{2}$  pounds. The second day there may also be either a gain or loss. As the weight of sheep varies from day to day, from 1 to 5 pounds in loss or gain, due chiefly to the increase or decrease of the amount of fodder and water in the stomach, the effects of dipping can not be estimated in twenty-four or forty-eight hours. In order to meet statements made concerning loss or gain in weight, this Bureau had sheep dipped at stated intervals, and the weights taken from week to week; all the sheep were kept under exactly the same conditions; the dips used were lime and sulphur, tobacco and sulphur, and two proprietary carbolic dips.

At the end of about two months, after three dippings, all of the sheep showed a gain, with the exception of one of the sheep from the carbolic dip, which lost slightly. The lowest gain among the sheep treated with tobacco dip was  $3\frac{1}{2}$  pounds, the highest  $11\frac{1}{2}$  pounds. The lowest gain among the sheep treated with lime and sulphur was 7 pounds, the highest  $8\frac{1}{2}$  pounds. The lowest gain among the sheep treated with the carbolic dip was  $1\frac{1}{2}$  pounds, the highest  $3\frac{1}{2}$  pounds, while one animal lost  $\frac{1}{2}$  pound. The sheep were given a fourth dipping, and at the end of another month showed the following gains and losses over their original weight at first dipping: Sheep treated with tobacco, 9 to 15 pounds gain; sheep treated with lime and sulphur,  $11\frac{1}{2}$  to 14 pounds gain; sheep treated with carbolic dip, 1 to  $6\frac{1}{2}$  pounds gain, in one case  $13\frac{1}{2}$  pounds lost.

The experiment was then repeated, the lime and sulphur being used on sheep previously dipped in carbolic or tobacco dips, and vice versa. After ten days the sheep treated with lime and sulphur had gained from 2 to 3 pounds; the sheep treated with tobacco had remained stationary or had lost from 1 to  $1\frac{1}{2}$  pounds; the sheep treated with carbolic dip had gained as high as 1 pound, or remained stationary, or had lost as much as  $2\frac{1}{2}$  pounds. At this point circumstances intervened which closed the experiments for the season.

Gillette has also made determinations of the loss of weight of sheep from dipping. Part of his results agree with ours and part differ. The chief point of difference in opinion is that Gillette considers that the best conclusion can be based upon weights taken a few days after dipping, while we consider the weight at a later period as the better criterion. Gillette gives weights from November 17 to December 22, and, taking the cases where the sheep have been dipped twice, we see from his tables that the carbolic sheep gained on an average 6 pounds, the sheep treated with tobacco gained 8 pounds, the sheep treated with arsenical dip gained 8 pounds, the sheep treated with lime and

sulphur<sup>1</sup> gained 9 pounds, while the sheep which were not dipped, in order to give a basis for comparison, gained 6 pounds.

Holding in mind that sheep may apparently gain or lose about 3 pounds per day when not dipped, it is seen from the experiments by Gillette, in Colorado, and by this Bureau, in the District of Columbia, that the oft-repeated claim that lime-and-sulphur dips give a greater setback than other dips is erroneous. In both the Western and the Eastern experiments the sheep treated with lime and sulphur averaged the greatest gain, the sheep treated with tobacco the second highest gain, while the carbolic sheep showed the lowest gain.

#### DIPPING PLANTS.

There are numerous kinds of dipping plants in use, the size and style varying according to the conditions which are to be met and the individual taste of the owner.

The farmer who has but a small flock can use a small portable vat for dipping, turning a part of his barn or some shed into a catching pen; by holding the sheep a moment at the top of the incline, as the animals emerge from the vat, and allowing them to drain, he can do away with the necessity of a draining yard.

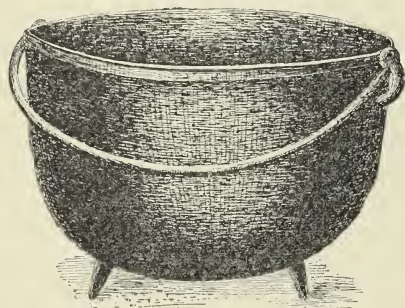


FIG. 5.—A simple caldron which may be used for boiling dip.

When large flocks are to be dipped at stated periods it will be economy to build a more permanent plant. Such a plant should consist of (1) collecting and forcing yards, provided with a (2) drive and (3) chute, or slide, into the (4) dipping vat, from which an (5) incline with cross cleats leads to the (6) draining yards.

Heating tanks or boilers are also necessary. For a small vat any

portable caldron (figs. 5 and 6) with a capacity of 30 to 100 gallons will answer, and the proper temperature may be maintained by pouring fresh hot ooze into the vat as the supply is exhausted by the dipping. In the large permanent plants the temperature can best be regulated by means of a steam pipe or hot water coil close to the floor of the tub.

Thermometers are an absolute necessity. The floating dairy thermometer (fig. 7) will be found to be most convenient, and several extra thermometers should be kept on hand to replace broken instruments. The thermometer is dropped into the vat and allowed to float for a short time, then quickly removed and the temperature determined. It is well to make paint marks at the side of the 100° and 110° points.

<sup>1</sup>Unfortunately for the comparison this lot did not receive the same fodder as the others.



*Building material.*—The yards and vat may be built of wood, concrete, cemented stone, or brick, according to the individual taste of the owner and the facilities at hand.

*Dimensions.*—The dimensions of the various parts given in the following descriptions may be varied according to the breed and the number of sheep to be dipped. Dipping liquid will be saved by making the tub much narrower on the bottom than at the top. On top, simple oblong dipping tanks vary from 1 foot 9 inches to 3 feet in breadth, 2 feet or 2 feet 6 inches forming a convenient medium. Floors vary from 6 inches to 3 feet in width, 9 inches forming a good working medium. Depth varies from 3 feet to 5 feet 6 inches, 4 feet to 5 feet forming a

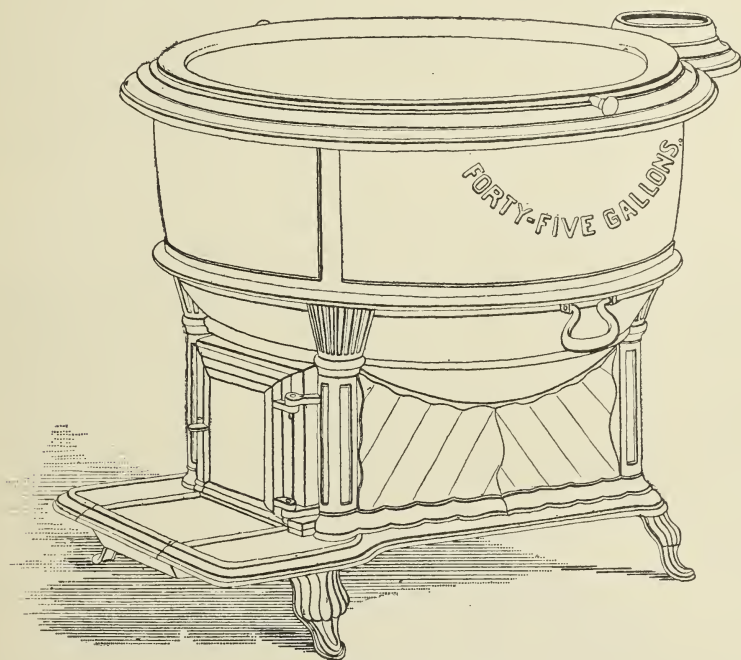


FIG. 6.—A caldron with stove.

convenient medium. If calves are to be dipped in the same vat it will be best to make the tub 5 feet or 5 feet 6 inches deep.

In sinking the tub in the ground it is always well to have the top of the tub 9 inches above the ground line. It is also well to sink one end (where the sheep are thrown in) slightly lower than the other end, as this will make it easier to empty and clean the vat.

*Crutches, or forks.*—In using large vats crutches, or dipping forks, are necessary, and even with small vats they are useful. Crutches should be 5 or 6 feet long. The handle should be strong (rake handles are a little too light). One end is provided with an iron ferrule, into which the bent iron is inserted. The iron should be one-half inch round

or three-quarters inch half round. The form of the crutches is shown in figs. 8 and 9.

*Gauges.*—The capacity of tubs should be plainly marked on the side every 3 or 6 inches, in order to correctly measure the amount of liquid.

#### SMALL PORTABLE VATS FOR SMALL FLOCKS.

If no regular dipping vat is at hand a good-sized tub may be used, as shown in fig. 10. Dipping in this manner is slow and tedious, but may be resorted to in case of necessity, as, for instance, when a few sheep are bought from another flock which is not known to be absolutely free from scab. If care is taken to dip thoroughly the dipping may be done as effectually in such a tub as it could be done in a large vat. Recourse to ordinary tubs is not advised, however, when it is possible to use regular dipping vats. Lambs may, in case of necessity, be dipped in troughs, as shown in fig. 11.

A small portable vat, suitable for use in dipping small flocks, is shown in fig. 12. When not in use this vat may be conveniently stored away. An advantage connected with this vat is that it may be drawn from place to place as desired. The dimensions here given may be varied, according to individual taste, by making the vat longer, broader, or deeper. A convenient size will be 9 feet long by  $2\frac{1}{2}$  feet broad at the top, 9 inches broad at the bottom, and  $3\frac{1}{2}$  to 5 feet deep; the floor measures 9 inches broad by 4 feet long; from 1 foot above one end of the floor a slant with cross cleats rises to the top and end of the vat. The sheep are dropped in by hand, one at a time, at the deep end, and after being held in the dip for two minutes are allowed to leave the vat at the slanting end. They are held a moment on the slant to allow them to drain off, thus economizing in dip. A gate may be placed at the deeper part of the slant if desired, in order to save labor. This gate should swing toward the exit of the vat. Such a tank may be made of  $1\frac{1}{2}$ -inch pine boards, with tongue and groove, and should be well pitched or painted.

This plan of vat may be easily modified, if desired, so as to have a small dripping pen attached, as shown in figs. 13 and 14. In this modified plan an inclined platform is added to the vat shown in fig. 12 and a removable skeleton box is made to fit over it. While one sheep is being dipped another sheep is allowed to ascend the incline into the small dripping pen. When the sheep is sufficiently drained the gate is opened, it leaves the pen, the gate is closed, the sheep in the vat enters the pen, and another sheep is placed in the vat.

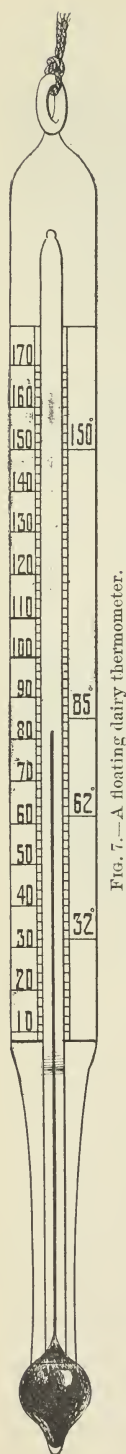


FIG. 7.—A floating dairy thermometer.

A small portable vat used in some places is shown in figs. 15 and 16. Dipping in a vat of this kind may be thorough, but is tedious.

Another style of small vat suitable for holding three sheep at a time is shown in fig. 17. It is estimated that 1,500 sheep may be dipped in this tub in a single day. The dimensions of the plant are given in the diagram, and need no further explanation.



FIG. 8.—A crutch, or dipping fork. (Copied from the *Agricultural Journal*, 1894, p. 261.)

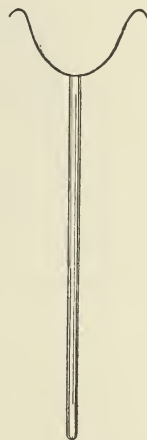


FIG. 9.—Another style of crutch, or dipping fork.

#### MORE PERMANENT PLANTS FOR LARGER FLOCKS.

##### RECEIVING AND FORCING YARDS.

Where large numbers of sheep are to be dipped, it is necessary to build receiving pens close to the dipping vat. The number and size of the pens vary with the number of sheep to be handled. The yards



FIG. 10.—Dipping sheep in a tub. (Copied from Stewart's *The Shepherd's Manual*, 1882, p. 47.)

may be either square or oblong, as shown in figs. 17 and 18, or they may be circular, as shown in fig. 19. The square or oblong yards are the more simple in construction and need no detailed description, as all details may be seen by consulting the diagrams. The circular yard, however, needs a word of explanation.

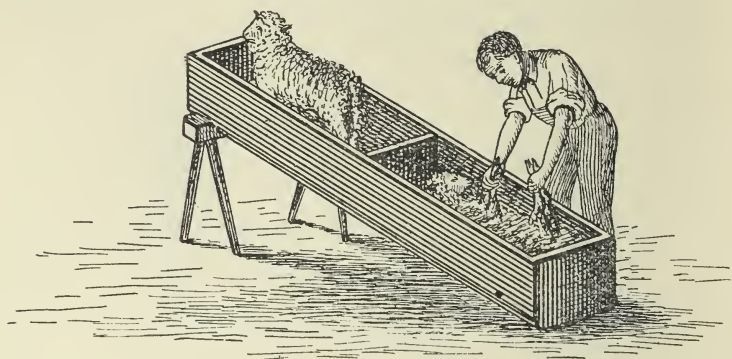


FIG. 11.—Trough for dipping lambs. (Copied from Stewart's *The Shepherd's Manual*, 1882, p. 48.)

In using the circular yards (fig. 19) two natural habits of the sheep are turned to practical account, so as to lessen the work of driving, namely, the habit sheep have of "ringing" when disturbed in a yard, and the tendency they show to escape at the point where they enter an inclosure.

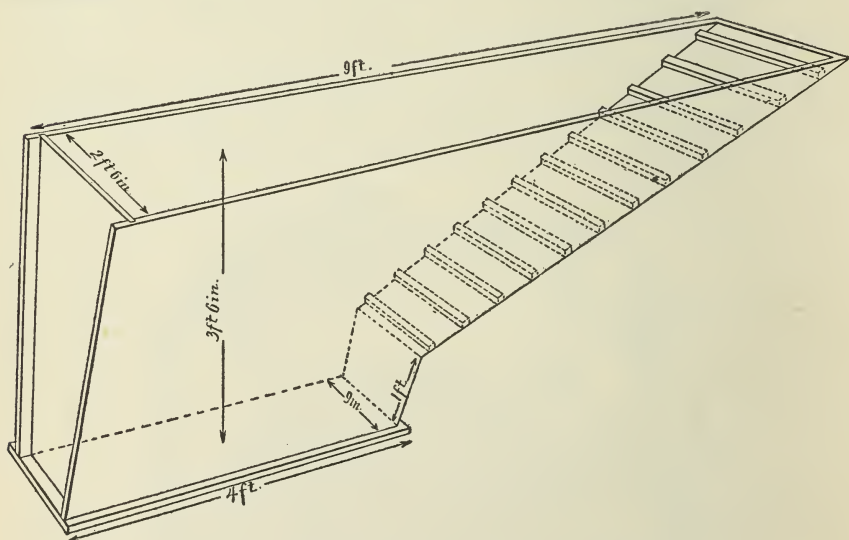


FIG. 12.—A small portable dipping vat for small flocks.

The flock is yarded at *AB* and find its way into yards 1 and 2 through the openings *CD* and *CE*. When these yards are full the gates *CD* and *AB* are closed to form yard 6. The sheep then circle through yards 3, 4, 5, and 6, coming to the point at which they entered



and expecting to escape. When yards 3, 4, 5, and 6 are filled the other gates are closed, so that the sheep can not return to yards 1 and 2. If

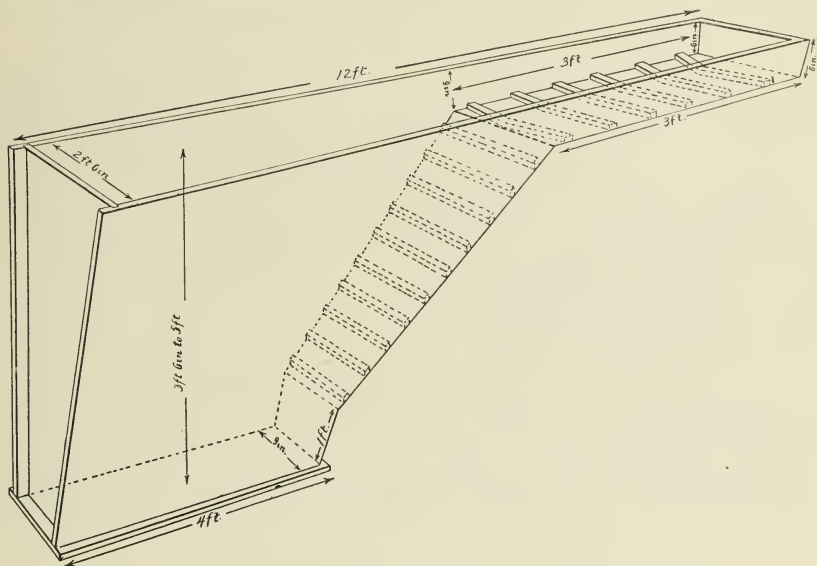


FIG. 13.—A small portable dripping vat with attached dripping platform.

the animals hesitate to enter yards 3, 4, 5, and 6, another natural tendency of the sheep may here be turned to account. A man jumps over the fence and runs through the flock in the opposite direction (6, 5, 4, 3)

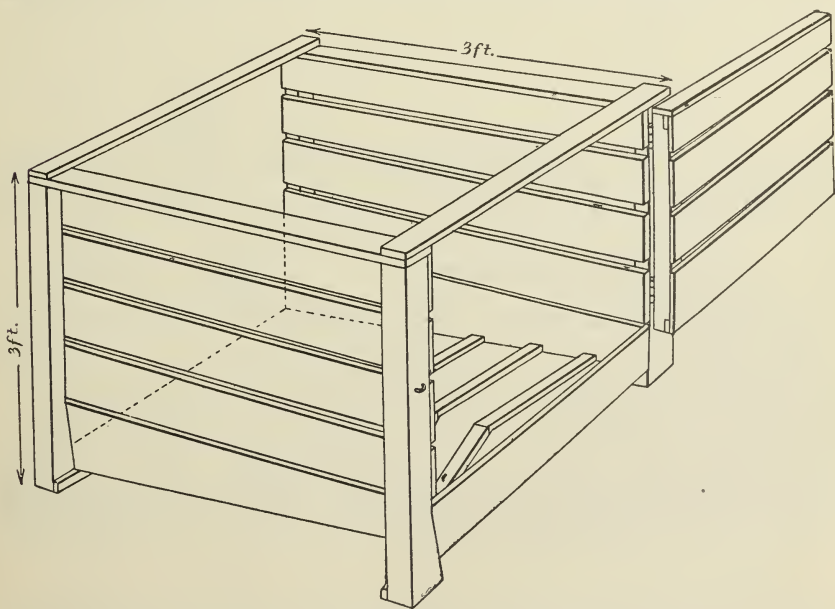


FIG. 14.—Detachable skeleton box, with gate, to fit over the dripping platform shown in fig. 13.

to that in which the animals are wanted to move. This will generally result in starting the sheep in the desired direction.

From the exit of yard 6 (*BC*) there should be built a narrow run extending to the dipping vat. This run should be about 20 feet long by  $2\frac{1}{4}$  feet wide, and should be provided with sides high enough, espe-

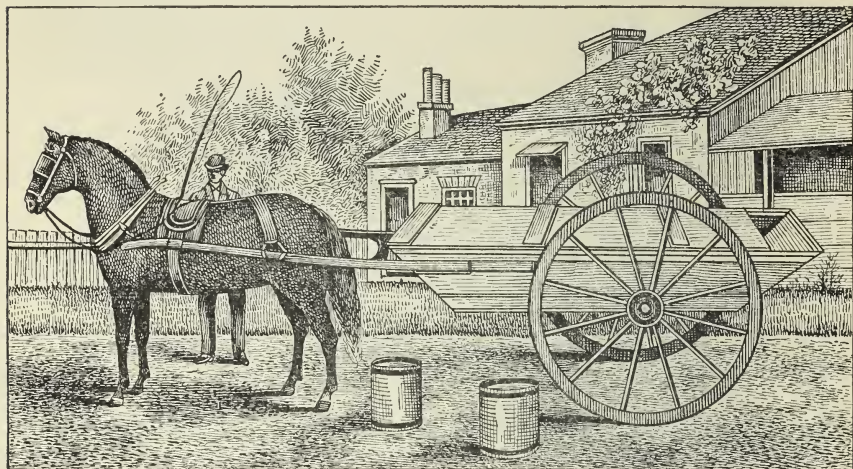


FIG. 15.—A small patented portable vat arranged as a cart. (Copied from Armatage, 1895, *The Sheep Doctor*, p. 494.)

cially near the vat, to prevent the sheep from jumping over and thus escaping. These sides should be continued a short distance along both sides of the vat. The last 5 feet of this run should slant downward toward the vat at an incline of 25 to 30 degrees, and should be

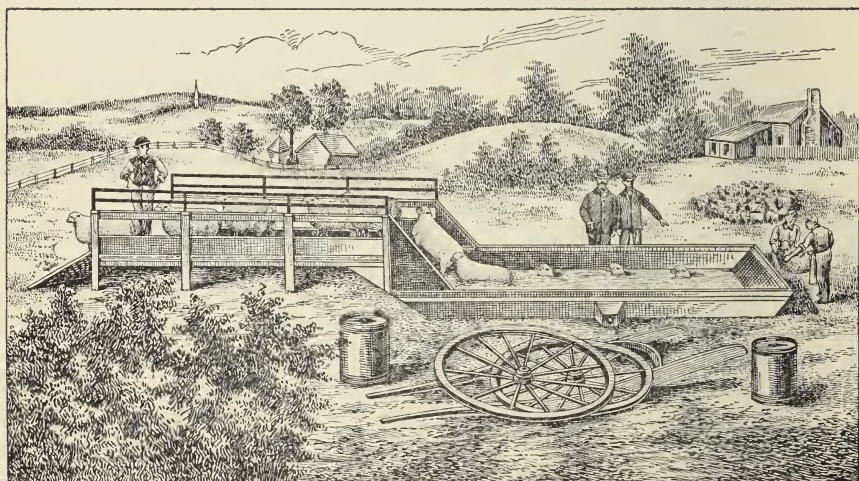


FIG. 16.—Portable vat unfolded and in use. (Copied from Armatage, 1895, *The Sheep Doctor*, p. 494.)

smooth. By pouring upon it some of the dip it may be made slippery so that the sheep will slide into the vat. If there is no natural incline toward the vat, an incline may easily be made by raising the floor of

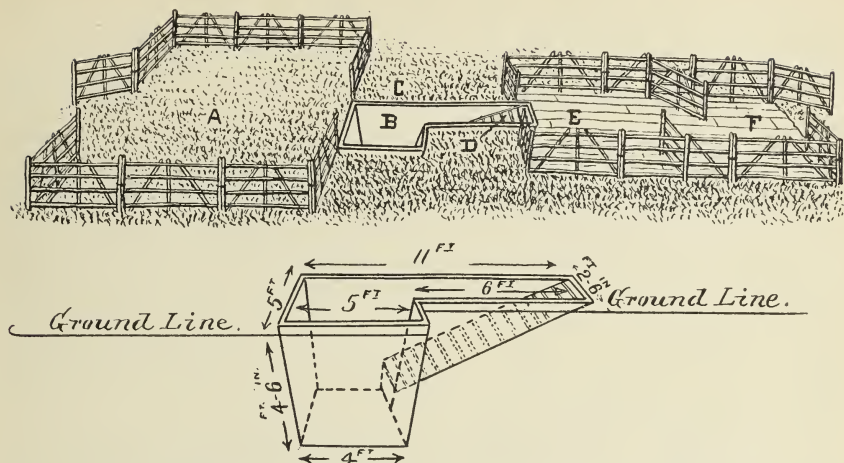


FIG. 17.—A small dipping plant: *A*, collecting yard; *B*, dipping vat; *C*, place for man with fork; *D*, incline, with cross cleats, to draining pens *E* and *F*. Lower diagram gives dimensions of the vat. (Copied from Sutherland's Sheep Farming, 1892.)

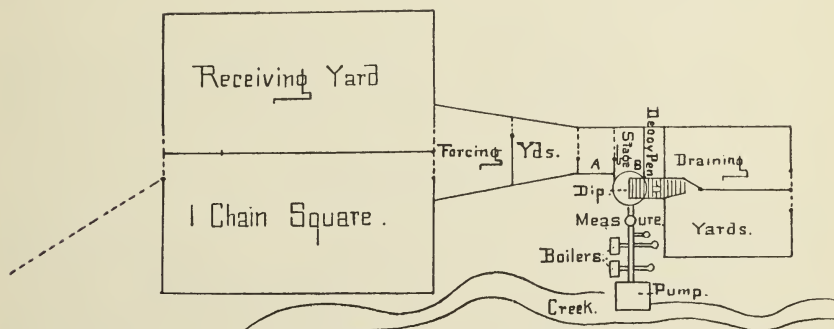


FIG. 18.—Receiving and forcing yards, with attached stage, decoy pen, vat, draining yards, etc. Scale 50 by  $1\frac{1}{2}$  inches. (Copied from Bruce's Scab and Its Cure, 1894, p. 17.)

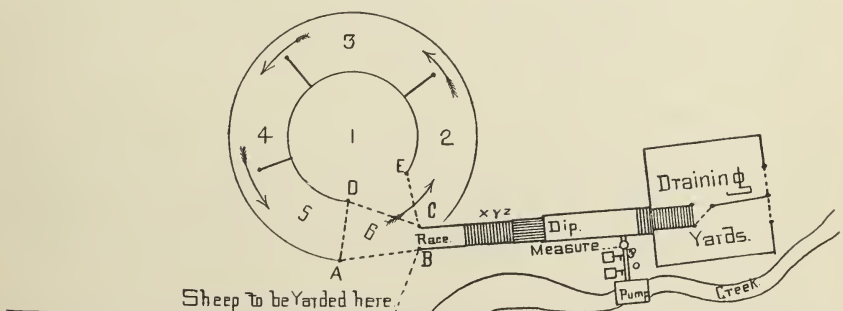


FIG. 19.—Australian circular receiving and forcing yards, with straight race or drive, the incline chute, straight vat, incline, two draining pens, etc. Scale 50 feet to  $1\frac{1}{2}$  inches, making the outer circle of the yards about 66 feet in diameter. (Copied from Bruce's Scab and Its Cure, 1894, p. 17.)



the run at a point 5 feet from the vat. The sheep will then pass up the incline *x* to the highest point *y*, then down the incline chute *z*.

Much time will be saved in dipping if the yards and run are arranged in such a way that the sheep in the race can not see the dipping vat. This can be accomplished by either of two simple methods: First, the run, instead of being straight, may be built with a sudden angle at the point *y* (see fig. 19); the vat will then not be visible to the sheep ascending the incline *x*; or, second, if a straight run is built as shown in fig. 19 a loose curtain of bagging may be hung at the point where the run joins with the vat. This curtain will fall back into place as the sheep drop into the vat.

A modification of the circular pen is seen in fig. 20, taken from Gibson's (1893) History and Present State of the Sheep Breeding Industry in the Argentine Republic.

#### CHUTES, OR SLIDES.

The most simple kind of chute is made by using an incline at the end of the run, as shown in fig. 19.

A second kind of chute in use is the endless-chain or treadmill chute, shown in fig. 21. Its construction can be seen from the diagram and need not be described in detail. This chute may be improved by building it on a slant toward the vat, in which case a bolt or other arrangement must be attached to stop the chute when desired; the weight of the sheep on the movable chute will help to carry the animals toward the vat.

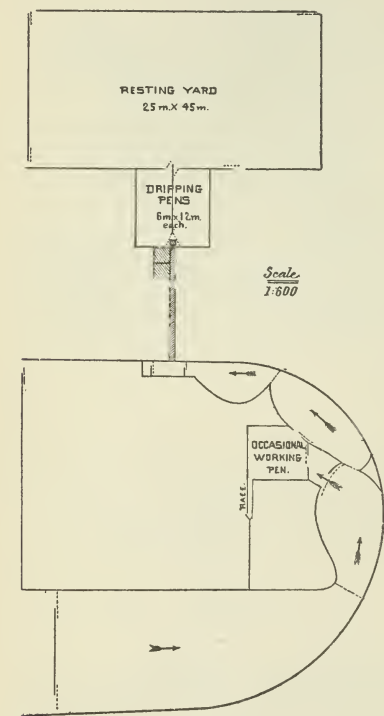


FIG. 20.—Argentine semicircular receiving and forcing yards, with a straight vat, draining pens, etc. The dimensions are given in the metric system: 1 m. (meter) equals 39.36 inches. (Copied from Gibson's History and Present State of the Sheep-Breeding Industry in the Argentine Republic, 1893.)

A third chute in use is a pivoted platform, shown in fig. 22. The sheep walk out on the platform until they overbalance its free end, and then, when a sliding bolt is removed, fall into the tank. The structure of the chute may be seen from the figure. Accidents are more likely to result from using this chute than from using the slant or the chain chute.

For dipping pregnant ewes some persons build a movable platform which can be lowered into the vat and raised at will.



## THE DIPPING VAT.

The dipping vat may be made on several different plans: The single oblong straight vat; the double or triple, with turns at the ends; the

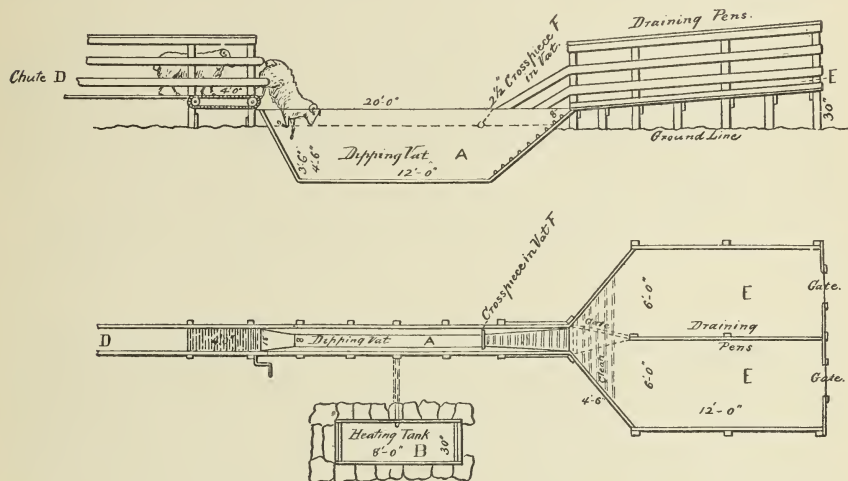


FIG. 21.—Dipping plant provided with an endless-chain or treadmill chute. (Copied from the American Sheep Breeder, 1891.)

square; or the circular. In case of single oblong vats, time will be saved in dipping if a long vat is used, so that the animals may swim

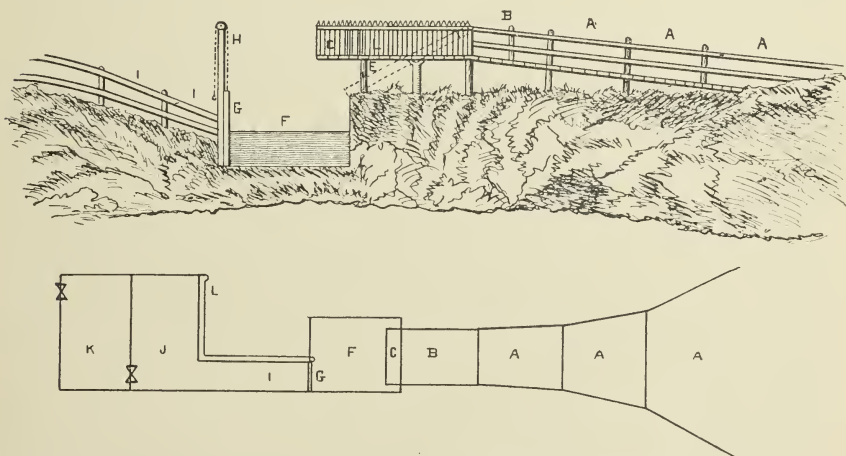


FIG. 22.—Dipping plant illustrating: *A*, collecting and forcing yards; *B*, straight drive; *C*, decoy pen in which several sheep are kept; *D*, dipping pen with pivoted floor *E*, secured by a bolt; by withdrawing the bolt the sheep are precipitated into the square tub *F*; *G*, sliding gate through which the sheep pass from the tub to the draining pens, *J* and *K*; *L*, channel for drip, conducting the ooze back to the vat. The lower diagram gives a surface view of the upper figure. (Copied from the Veterinarian, 1862, p. 333.)

directly through without stopping, and then leave the tank. Very naturally the longer the vat the more building material and ooze will be required. Vats are in use varying from 10 to 120 feet long.

*The single oblong vat.*—Single oblong dipping vats are shown in figs. 18, 19, 20, 21, 23. These tanks should be made about  $2\frac{1}{2}$  feet broad at

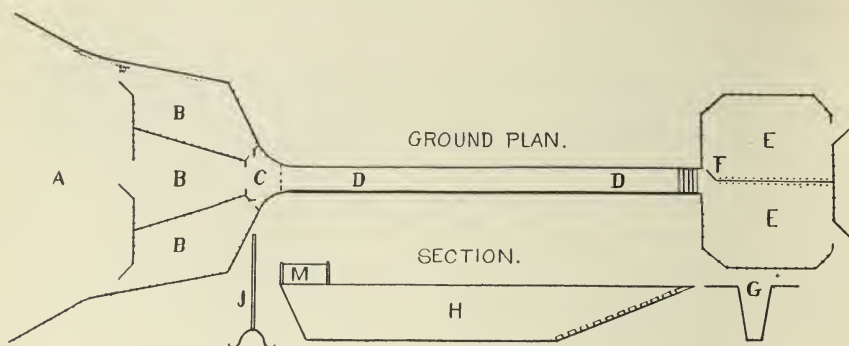


FIG. 23.—A, collecting yard for the sheep which are to be dipped; B, B, B, small pens leading to C, an inner pen with an inclined chute, or in which a man may stand to pass the sheep one at a time into the vat; D, D, the tub, which should measure from 20 to 120 feet long, 21 to 30 inches broad at the top, 6 to 9 inches broad at the bottom; M, board 2 feet high on each side of the entrance of the vat to catch the splash and to prevent the sheep from escaping; E, E, draining, or dripping, pens; F, swinging gate; G, cross section of the tub; J, crutch for keeping the backs of the sheep under the surface, and for catching or holding sheep in the dip. (This drawing is taken from the *Agricultural Journal*, III, 1891, p. 236; it was also published in the *American Sheep Breeder*, Feb. 15, 1892.)

the top, 9 inches broad at the bottom, and 4 to 5 feet deep; the length may be 20 to 120 feet, as desired. One end (the entrance) should be straight, as shown in figs. 24 and 26, or with a steep slant, as shown in figs. 21, 23, and 25, while the last 5 to 14 feet at the other end (exit) should have a gradual slant with cross cleats.

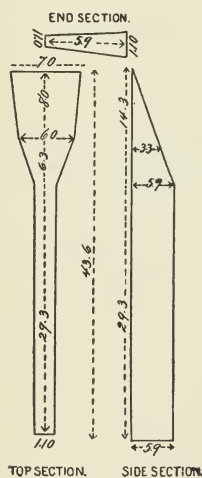


FIG. 24.—A straight vat known as the Australian sheep dipping tank.<sup>1</sup>

*The square vat.*—A square vat is shown in fig. 22. This tub should be 5 feet deep, and large enough to hold 10 or 12 sheep at a time. The square vat does not present any particular advantages over narrow oblong vats, except that it gives the sheep an opportunity to swim around. This kind of a vat is not in very general use among large herders.

*The triple vat.*—In the triple vat (fig. 28) the sheep come through the run, or drive, and slide into the first vat at A; swimming in the direction of the arrows they round the turns B and C, ascend the incline D, and enter the draining pens. The theory upon which this triple vat is used is that upon rounding the point B the sheep bend toward the left, thus crumpling the scabs on the left side and opening the wool on the right; upon rounding the point C they bend toward the right, crumpling the scabs of that side and opening the

<sup>1</sup> This vat is in use at Tulcumbah station, New South Wales, and gives much satisfaction. The swimming race is 29 feet 3 inches long, 1 foot 10 inches wide at top, with gradual inward slope to 11 inches at the bottom, and 5 feet 9 inches deep; the landing stage (slant) is 14 feet 3 inches long (surface measurement), with a rise of 5 feet 9 in 14 feet 3 inches. To allow for any weak sheep, which stand in the way and block the others at the end of the swim, the landing stage opens out from 1 foot

wool on the left. This is evidently a more theoretical than practical consideration.

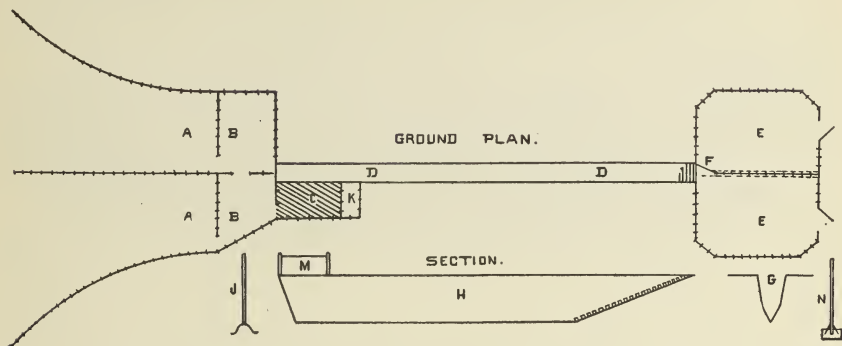


FIG. 25.—A somewhat similar straight swim taken from Sutherland's Sheep Farming: *A*, collecting pens; *B*, smaller pens; *C*, small pen at the side of the vat; *K*, decoy pen in which several sheep are placed to induce the sheep in pen *B* to enter pen *C*; *D*, a tub 50 to 60 feet long, 5 feet deep, 21 inches broad until 3 feet from the top, then narrowing to 6 or 8 inches at the bottom, as shown in the cross section, *G*; *M*, a board 2 feet high to catch the splash; the last 18 feet of the swim slants gradually, with cross cleats, to the draining pens, as seen in *H*; *E*, *E*, draining pens, worked alternately with the swinging gate, *F*; each pen measures 24 by 15 feet, and should slant toward the vat; *J*, crutch 5 or 6 feet long; *N*, mixer for stirring the liquid.

Each run should be about 15 to 30 feet long and  $2\frac{1}{2}$  feet broad; the tank should be  $4\frac{1}{2}$  to 5 feet deep and 4 to  $7\frac{1}{2}$  feet wide at the bottom.

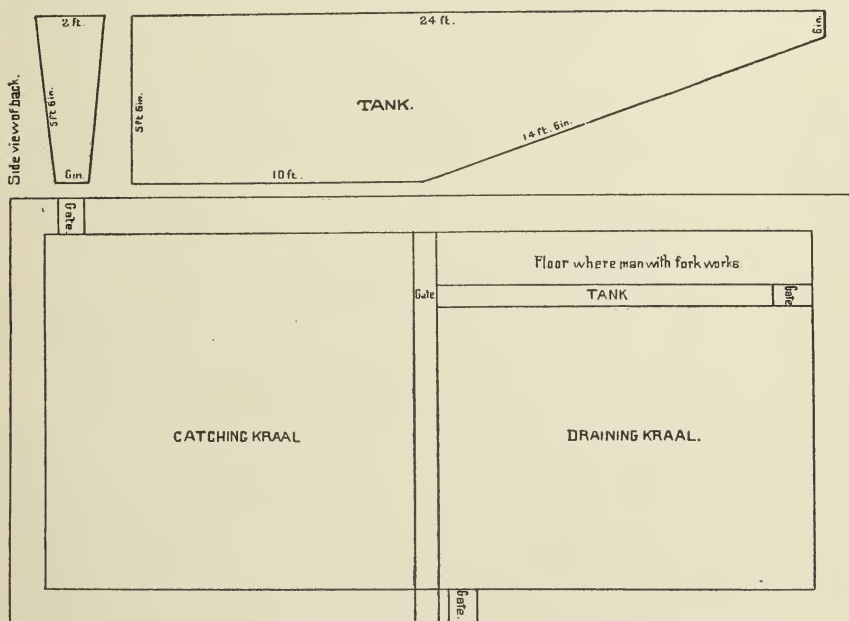


FIG. 26.—A dipping plant figured in the Agricultural Journal, 1894, p. 620, in use in South Africa.

At the point *A*, where the sheep fall into the swim, it is best to have the floor of the first run  $2\frac{1}{2}$  feet wide for a distance of 6 feet, in order

10 inches at top and 11 inches at bottom to a width (top and bottom) of 6 feet at a distance of 6 feet 3 inches (longitudinally) from the end of the swimming race, and gradually widens for the remaining 8 feet of length to a width of 7 feet at the end.

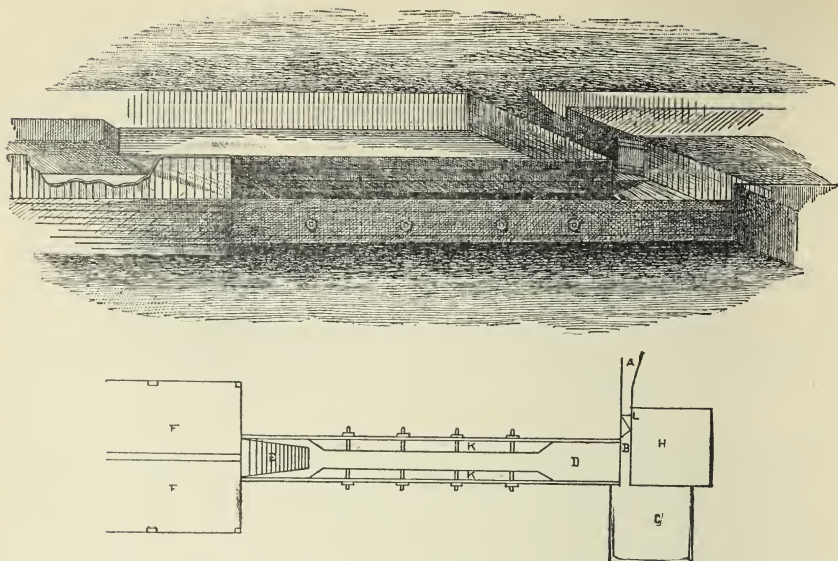


FIG. 27.—A dipping plant in use in Millard County, Utah. *A*, chute from the large corral; *B*, a sloping board over which the sheep in attempting to pass to the decoy pen, *C*, slide into the tank, *D*; *K, K*, two pieces, 2 by 6 inches and 12 feet long, bolted lengthwise of the tank, leaving a 12-inch space in the middle of the dip through which the sheep must put their heads, preventing those in rear from riding those in front, at the same time keeping their backs under the dip. (Copied from Powers' *The American Merino*, 1887, p. 308.)

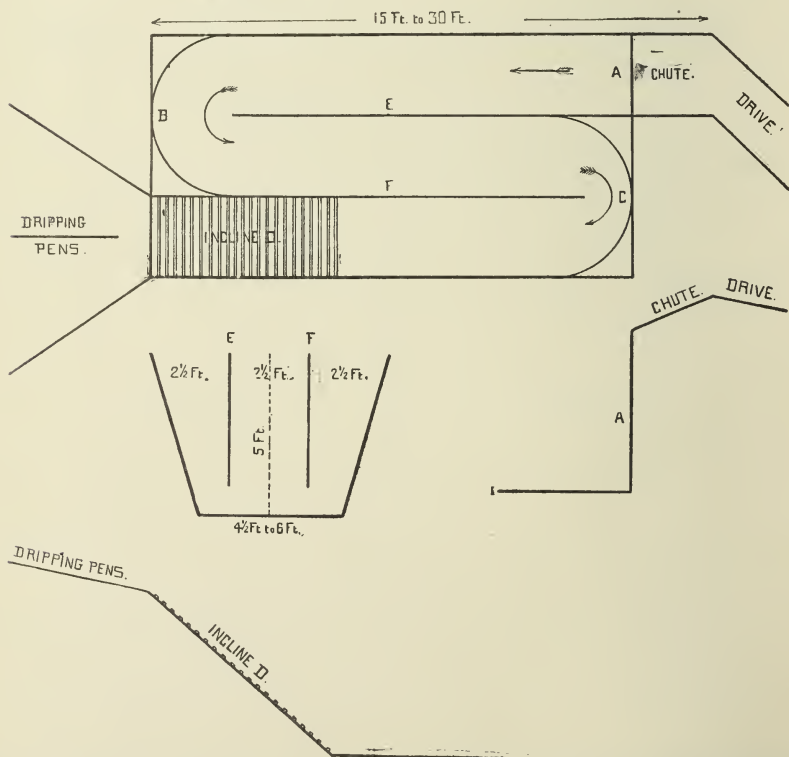


FIG. 28.—A triple vat. The various diagrams give surface view, cross section, vertical section of entrance to the vat, and vertical section of the incline and dipping pens.



to prevent accidents, but beyond that distance the floor may be narrowed in order to save the dipping fluid. If the partitions *E* and *F* are not made solid the ooze will circulate more easily and thus remain at a more even temperature; the boards should be close enough together, however, to prevent the sheep from catching their feet in the cracks. A gate should be arranged at *D*, so that the animals may be delayed in the ooze, if desired. (See also fig. 36 of the triple vat in use at the Chicago Stock Yards.)

*The circular vat.*—Some parties prefer a circular vat (fig. 29). The advantages set forth in favor of this are, first, a fewer number of men are required to attend to the animals in the tub; second, where it is

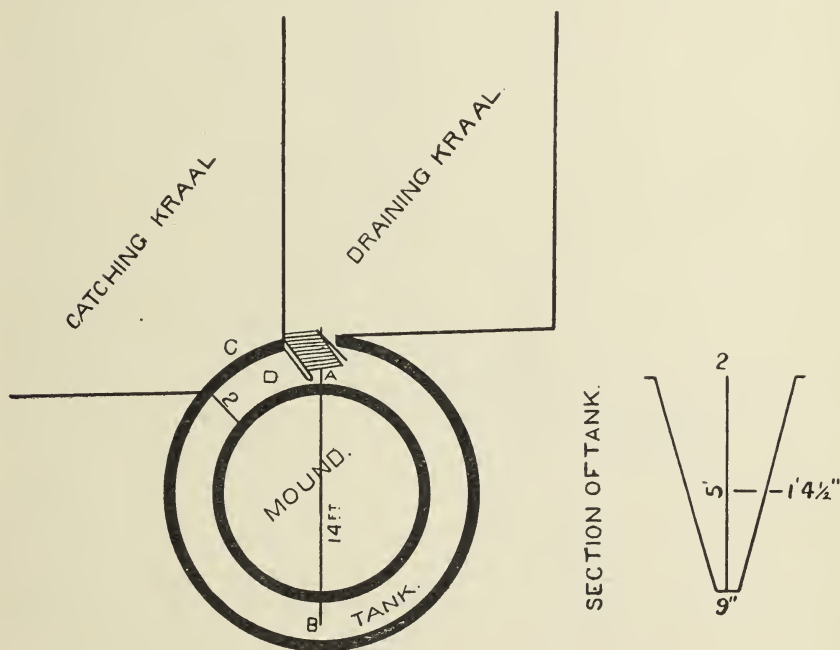


FIG. 29.—A circular dipping tank. (Copied from the Agricultural Journal, 1895, p. 119.)

desired to give any particular sheep an extra long swim, this may be done by quickly closing the gate *D* at the exit, thus compelling the animal to swim around again, without delaying the other sheep; third, by building a circular vat with a circumference of 30 feet the animals may be made to swim around two, three, or four times, thus gaining the advantage of a tank 60, 90, or 120 feet long, yet with a much smaller amount of building and dipping material.

The vat should be  $2\frac{1}{2}$  feet broad at the top, 9 inches broad at the bottom, and 5 feet deep. To determine the circumference multiply the diameter by 3.1416.

Despite the advantages of the circular tank in saving material and obtaining the advantages of a long swim, there are two rather serious

objections to it: First, in the vat as shown in fig. 29, it is necessary to throw the animals in by hand, since a chute directed into the circle would lead to accident; second, the circular vat is much more difficult of construction than the straight vat.

These objections may, however, be overcome in several ways, still preserving all the advantages. If a circular vat is preferred and a

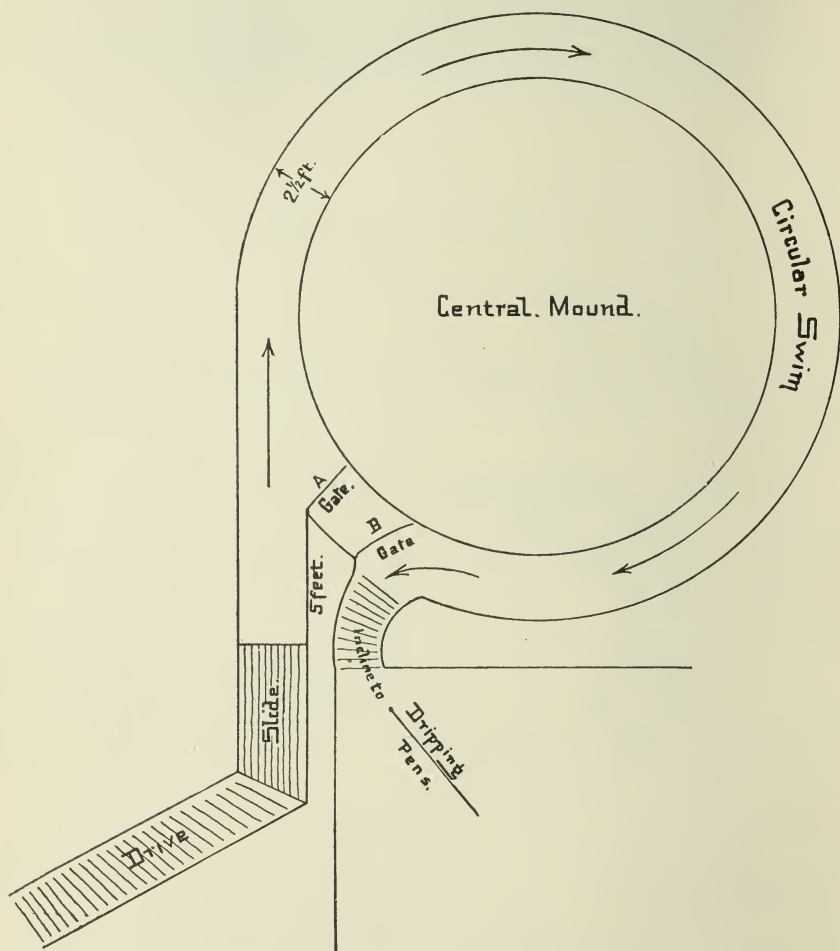


FIG. 30.—A circular dipping tank, with drive and slide.

chute is desired, the object may be attained by building a short, straight vat on a tangent to the circle, as shown in fig. 30. In this case, two swinging or sliding gates, *A* and *B*, will be required.

*The double vat.*—All of the advantages of the circular vat may be combined with the easy construction of the straight vat by building a straight tub with a double channel, as shown in figs. 31 and 32, the

second swim being prolonged in an incline to the draining pens. Such a vat may be constructed as follows:

Build an oblong tub 15 feet long, 5 feet deep, 5 feet wide at the top, and 3 to 5 feet wide at the bottom. Running lengthwise through the center, build an upright, partially open, partition 10 feet long and  $4\frac{1}{2}$  feet deep (measured from the top of the tub), leaving an open space of  $2\frac{1}{2}$  feet at each end and 6 inches at the bottom; this partition is supported by three uprights running to the floor of the tub, and cross supports may be placed on top of the tub at any point except near the entrance of the

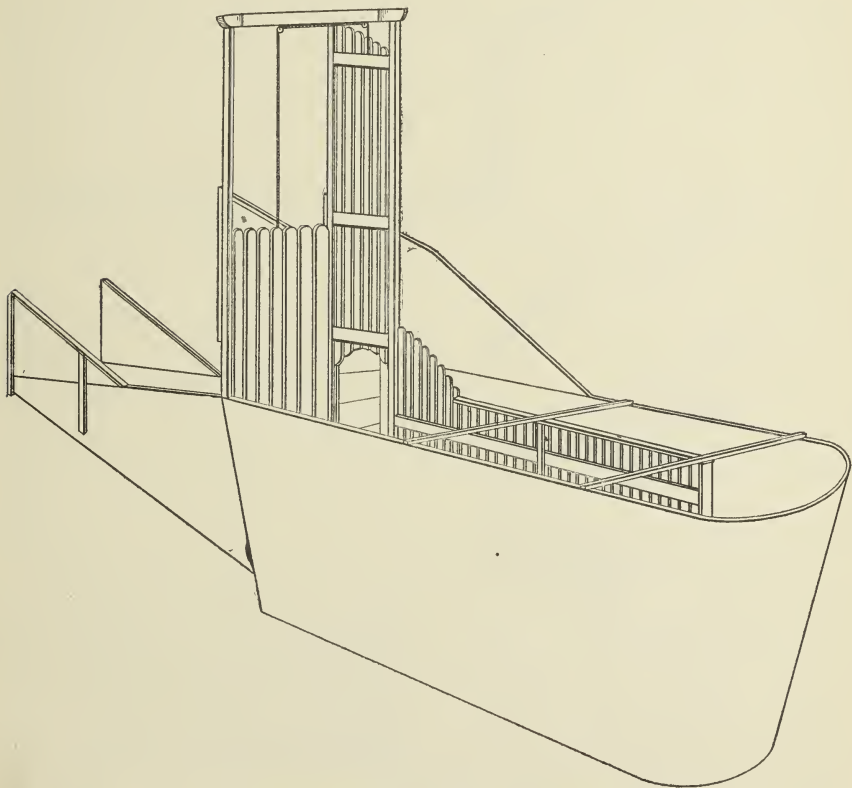


FIG. 31.—View of double oblong swim. (Consult also fig. 32.)

swim. A gate is hung at one end between the slide (entrance) and the incline (exit), and should extend above the tub, in order to prevent the sheep from jumping over the middle partition into the second swim; it should extend down to within about 6 or 12 inches of the floor of the tub. When this gate is closed against the middle partition the sheep will leave the vat by the incline to the draining pens; when it is closed against the incline, the sheep can be forced to swim around the tub two or three times, as desired. Or, in place of a swinging gate, two sliding gates may be arranged to run up and down in grooves, balancing each

other or each balanced separately by weights. One of these gates is placed between the end of the vat and the end of the middle partition, the other is placed at the entrance of the incline to the draining pens.

By constructing the double vat and sending the sheep around three times there would result, first, a saving in the original cost of the tank when compared with a 90-foot straight swim; second, a saving in space; third, less than half as much dip would have to be kept warm at a time; fourth, less than half as much dip would have to be made

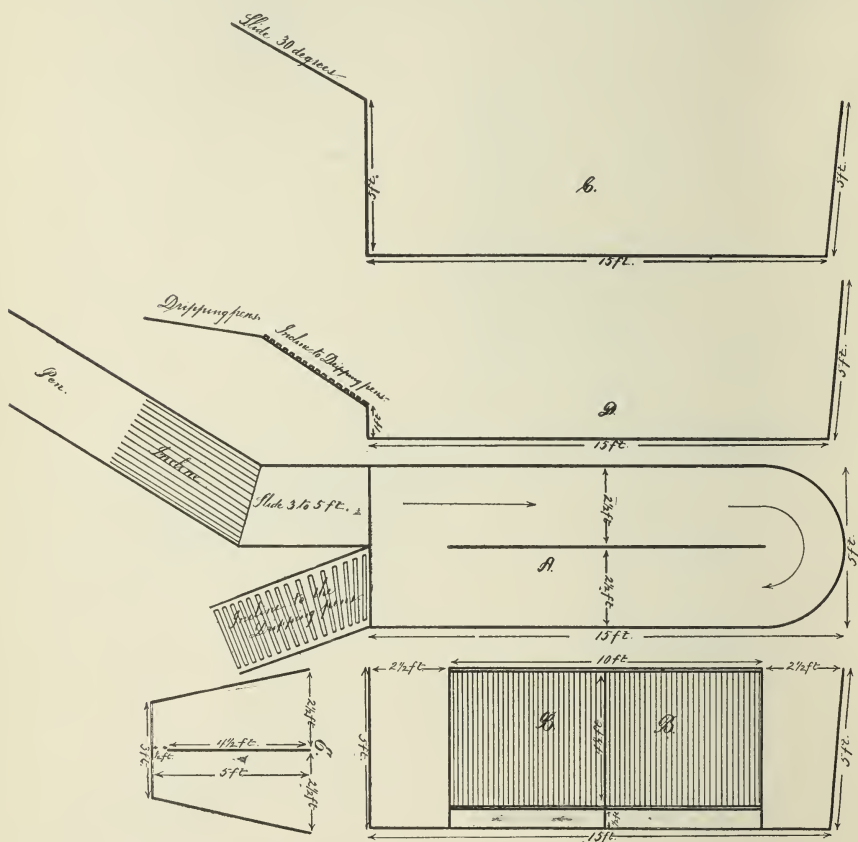


FIG. 32.—A double oblong swim: A, ground plan; B, side view of the middle partition; C, longitudinal section of the first swim; D, longitudinal section of the second swim, with incline; E, cross section of the entire vat, with partition in the center.

up at a time; fifth, the residue after dipping would be reduced and thus the loss decreased. It would, however, take a longer time to dip a large flock of sheep in such a vat than in a straight vat 90 feet long.

#### THE INCLINE TO THE DRIPPING PENS.

At the end of the vat an incline, with cross cleats, is built so that the sheep may leave the dip of their own accord and enter the draining pens. A board fence, 2 feet high above the top of the vat, should run



a few feet each side of this incline to prevent the sheep from escaping. These inclines are shown in figs. 21, 23, 25, and 26; the rise for fat heavy wool sheep must not be too steep, otherwise the exertion will be too great. In fig. 24 the incline is 5 feet 9 inches in a surface distance of 14 feet 3 inches. At the Chicago Stock Yards the incline is 9 feet.

Much labor will be saved if a hinged or, still better, a sliding gate

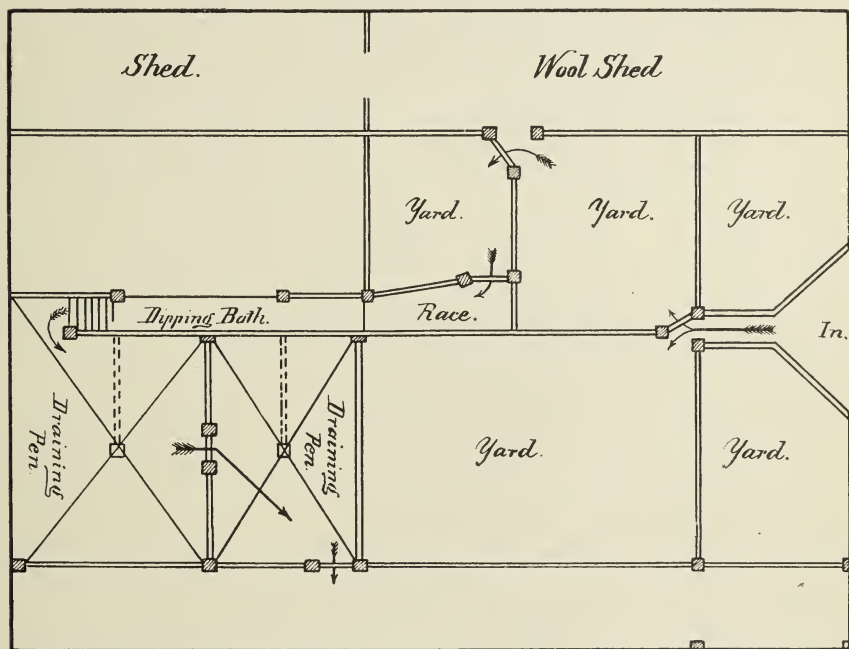


FIG. 33.—Ground plan of yards and vat. (Copied from Armatage, 1895, *The Sheep Doctor*.)

is placed at the deepest portion of the incline. The sheep may thus be held in the dip as long as desired; when the time is up the gate is opened and the sheep enter the draining pens.

#### THE DRIPPING PENS.

There should be two dripping pens side by side (figs. 17, 18, 21, 23, and 33) with a swinging gate at the entrance; one is filled, the gate is then closed, opening the other pen; when the second pen is filled the first pen is emptied; or the pens may be in direct line with the vat (figs. 17 and 22).

These pens should have a slight incline toward the tub so that the dripping ooze will run back to the tub. A good plan is to build the incline from the sides toward the center fence; under the fence build a partially covered gutter inclining to the tub; the cover of the gutter should be removable to allow cleaning; at the end of the gutter nearest the tub place a grating to catch the wool and droppings, thus preventing these materials from being washed into the dip.

## SHELTER FOR THE DIPPING PLANT.

The vat, boilers, and dripping pens should be under cover, and it will be well to extend the cover over the drive and the forcing pens.

## ARRANGEMENTS FOR CLEANING.

Cleaning the plant may be facilitated if the following suggestions are observed: It is well to have one end of the vat slightly lower than the other end, so that the ooze will run toward that point when the tub is being emptied. If the entire floor of the collecting pens is made of brick, cement, or boards, and inclines slightly toward one or two points, the yards may be more easily cleaned by means of a hose and

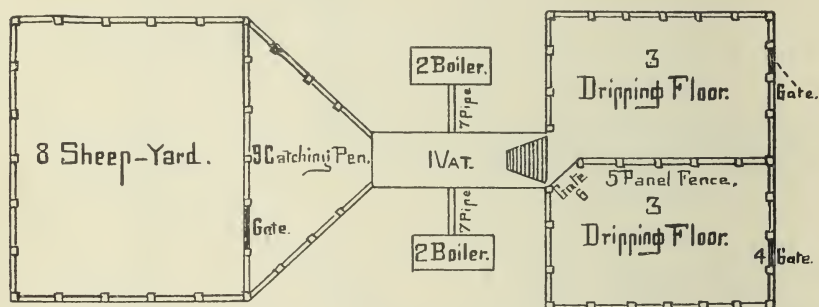


FIG. 34.—Ground plan of yards and vat. (Copied from Powers' *The American Merino*, 1887, p. 304.)

stream of water. If this plan is adopted there should be an upright baseboard or a solid wall of concrete or brick a few inches in height running around the edge of the entire pen. If there is direct sewer connection for the vat a trap or manhole should be made to catch the droppings and the tags of wool, otherwise the sewer pipe will become obstructed.

## BOILING, INFUSING, AND SETTLING TANKS.

The arrangement of the boiling tanks depends upon two factors in particular: First, upon the kind of dip used; second, upon the arrangement adopted for keeping the bath at the proper temperature.

In case a steam pipe is placed near the floor of the dipping vat in order to keep the ooze at its proper temperature while dipping, the vat itself may be used for heating water. Clear water is run into the vat and the steam turned on full force until the proper temperature is obtained. If a carbolic or a prepared tobacco dip is used, the material may then be mixed in the vat if desired. Even in this case, however, it is best to provide a separate boiling tank for heating and preparing fresh ooze to replace the dip as it is used up.

These boiling tubs may be made of wood or iron, according to the facilities at hand. If steam is to be had, the square or round wooden boiling tub may be used, and an open steam pipe run into it to heat the water. If the steam pipe can not be used, either in the vat or in



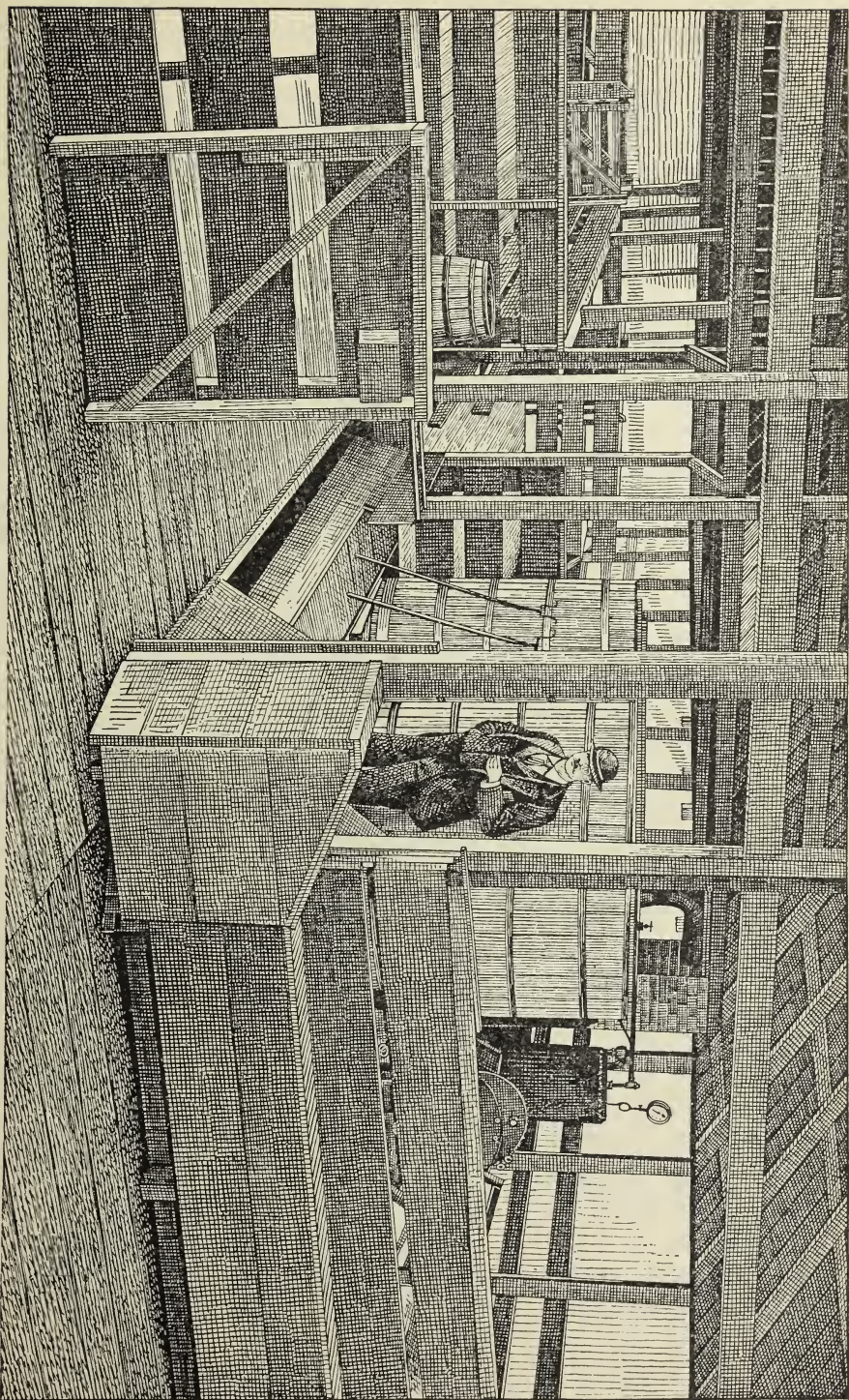


FIG. 35.—View of the dipping plant at the stock yards, South Omaha, Neb.

the boiling tanks, iron tanks should be provided. The iron tanks are set in brick or stone frames, with a fireplace below. It is best to have two tanks, each with a capacity of about 400 gallons.

If a homemade tobacco dip is prepared from the leaves there should also be provided two iron infusing caldrons, each with a cover and with a capacity of 80 to 120 gallons. The infusion is prepared in these smaller tanks, while the bulk of the water is heated in the boiling tanks or in the swim itself.

If a lime-and-sulphur dip is used it is absolutely necessary to provide some means for settling the mixture, in order that the bath may be free from sediment. This may be done in two ways. The better way is to have separate settling tubs provided with bungholes or pipes three or four inches from the bottom. After the mixture is thoroughly boiled it is pumped into the settling tubs and allowed to remain there until it is perfectly free from sediment; the clear liquid is then run into the dipping vat and diluted with warm water to the proper strength. Or the boiling tanks may also be used as settling vats. A pipe with elbow joint is run into the boiling tank three or four inches above the bottom; the opening of the pipe should point sidewise, not up. After boiling the proper length of time the fire is removed and the liquid allowed to stand until clear; only the clear ooze is drawn off, the sediment remaining on the floor of the boiling tank.

#### MEASURES.

The capacity of the vat should be marked at different depths. The capacity of the boilers should also be marked in the same way. If these are marked for every 100, 200, 300, or 500 gallons (according to the amount of dipping to be done), separate measuring tanks will be unnecessary. In case the tanks are not marked a separate measuring tank should be provided.

If a homemade tobacco dip or a lime-and-sulphur dip is used a set of scales is necessary. To guess at weights in mixing lime and sulphur may result in too strong a dip.

#### PUMPS.

A portable pump will be found of great use in filling and emptying tanks.



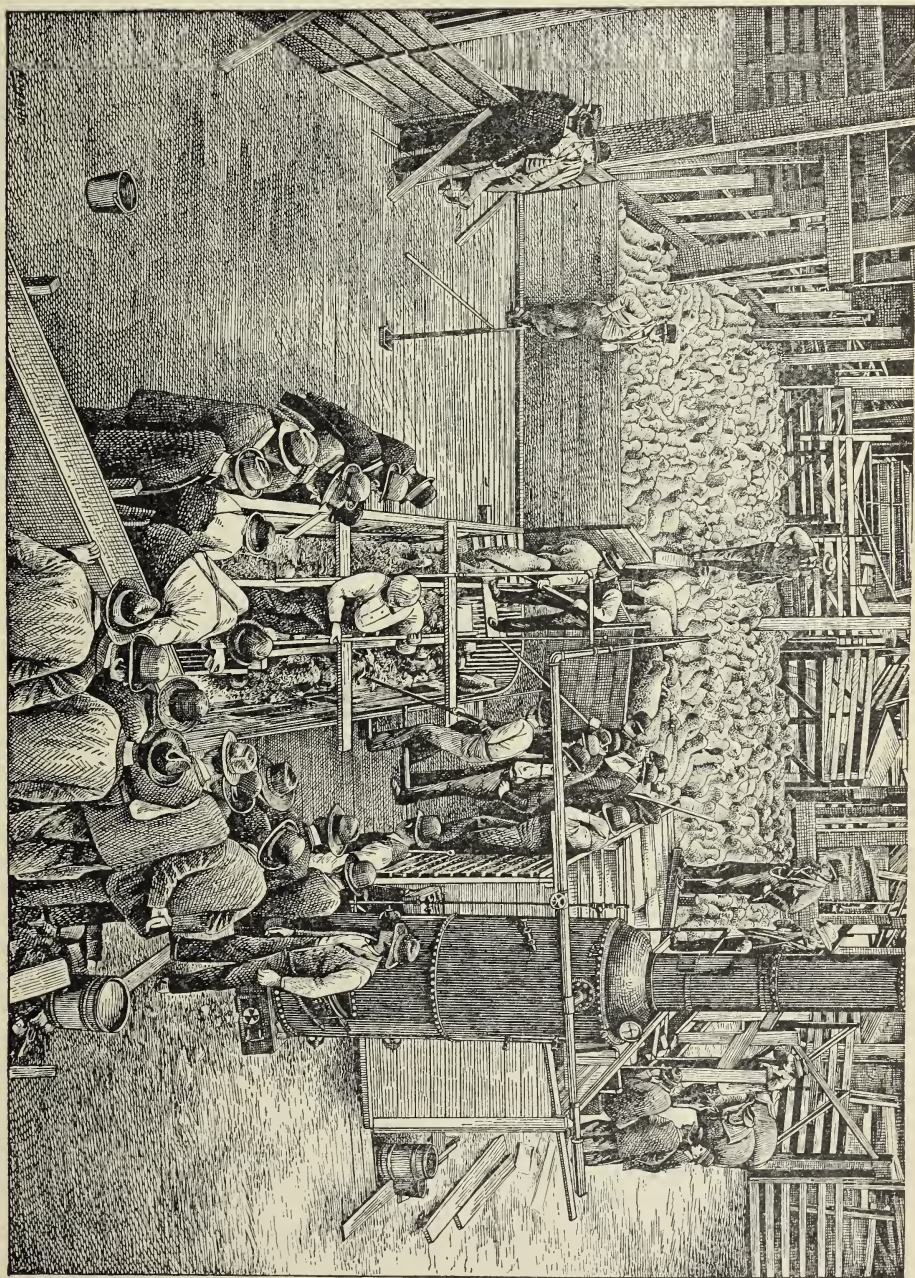


FIG. 36.—View of the dipping plant at the Union Stock Yards, Chicago, Ill. (This dipping plant, including vat, boiler, etc., cost about \$2,500.)

## FEDERAL LAWS AND REGULATIONS RELATIVE TO SHEEP SCAB.

As the scab of the sheep is unquestionably a contagious disease, it is unlawful to ship sheep so affected from any State, Territory, or the District of Columbia into any other State, Territory, or the District of Columbia. The penalties for such shipment of diseased sheep are heavy, as will be seen from an examination of sections 6 and 7 of the act approved May 29, 1884, which are as follows:

SEC. 6. That no railroad company within the United States, or the owners or masters of any steam or sailing or other vessel or boat, shall receive for transportation or transport, from one State or Territory to another, or from any State into the District of Columbia, or from the District into any State, any live stock affected with any contagions, infectious, or communicable disease, and especially the disease known as pleuro-pneumonia; nor shall any person, company, or corporation deliver for such transportation to any railroad company, or master or owner of any boat or vessel, any live stock, knowing them to be affected with any contagions, infectious, or communicable disease; nor shall any person, company, or corporation drive on foot or transport in private conveyance from one State or Territory to another, or from any State into the District of Columbia, or from the District into any State, any live stock, knowing them to be affected with any contagions, infectious, or communicable disease, and especially the disease known as pleuro-pneumonia: *Provided*, That the so-called splenic or Texas fever shall not be considered a contagious, infectious, or communicable disease within the meaning of sections four, five, six, and seven of this act, as to cattle being transported by rail to market for slaughter, when the same are unloaded only to be fed and watered in lots on the way thereto.

SEC. 7. That it shall be the duty of the Commissioner of Agriculture to notify, in writing, the proper officials or agents of any railroad, steamboat, or other transportation company doing business in or through any infected locality, and by publication in such newspapers as he may select, of the existence of said contagion; and any person or persons operating any such railroad, or master or owner of any boat or vessel, or owner or custodian of or person having control over such cattle or other live stock within such infected district, who shall knowingly violate the provisions of section six of this act, shall be guilty of a misdemeanor, and, upon conviction, shall be punished by a fine of not less than one hundred dollars nor more than five thousand dollars, or by imprisonment for not more than one year, or by both such fine and imprisonment.

The provisions of this statute are very specific and clear, and there can be no possible doubt of their application to the disease under consideration. Congress has, nevertheless, gone still further by way of emphasizing this application, and has particularly directed the attention of the Department of Agriculture to a few important diseases, including sheep scab, by the following clause, which has been repeated in the appropriation act for a number of years:

\* \* \* and the Secretary of Agriculture is hereby authorized to use any part of this sum he may deem necessary or expedient, and in such manner as he may think



best, in the collection of information concerning live stock, dairy, and other animal products, and to prevent the spread of pleuro-pneumonia, tuberculosis, sheep scab, and other diseases of animals, and for this purpose to employ as many persons as he may deem necessary.

Acting in accordance with this legislation, the following orders have been made and promulgated by the Secretary of Agriculture:

REGULATIONS PROHIBITING THE TRANSPORTATION OF ANIMALS AFFECTED WITH HOG CHOLERA, TUBERCULOSIS, OR SHEEP SCAB.

U. S. DEPARTMENT OF AGRICULTURE,  
OFFICE OF THE SECRETARY,  
*Washington, D. C., December 13, 1895.*

Notice is hereby given that under the law relating to control of contagious and infectious diseases of animals, the regulations of the Bureau of Animal Industry dated April 15, 1887, are hereby amended by additional section, as follows:

SEC. 15. Animals affected with hog cholera, tuberculosis, or sheep scab shall be considered animals affected with contagious or infectious diseases as designated by the law and the regulations of the Bureau of Animal Industry, and shall not enter into interstate trade nor be brought into contact with other animals intended for such trade. Such affected animals shall not be permitted to enter any stock yards or other places where animals are handled for interstate trade, and when so found at such places shall be condemned, tagged, and placed in quarantine by inspectors or employees of said Bureau until proper disposition is made of same.

Stock-yard companies, transportation companies, or others receiving or handling such diseased animals are hereby required to thoroughly disinfect such portions of their premises or property as contained such diseased animals, subject to the approval of the inspectors of said Bureau.

Such diseased animals so quarantined shall not be removed therefrom except by written permit of the inspector in charge. When such diseased animals are found, inspectors shall make careful inquiry as to shipper and owner of same, and transportation company handling same, for the purpose of instituting prosecution under the law provided in such cases.

All animals entering stock yards where inspection exists shall be carefully inspected and those affected with the contagious diseases above mentioned shall be condemned and tagged, and when so condemned shall not be shipped therefrom or enter into the interstate trade; and all violations of this regulation should be immediately reported to the Chief of the Bureau of Animal Industry for institution of prosecution according to law.

*J. STERLING MORTON, Secretary.*

(B. A. I. ORDER NO. 5.)

TRANSPORTATION OF SHEEP AFFECTED WITH SCABIES.

U. S. DEPARTMENT OF AGRICULTURE,  
OFFICE OF THE SECRETARY,  
*Washington, D. C., June 18, 1897.*

*To the Managers and Agents of Railroads and Transportation Companies of the United States, Stockmen, and Others:*

In accordance with section 7 of the act of Congress approved May 29, 1884, entitled "An act for the establishment of a Bureau of Animal Industry, to prevent the exportation of diseased cattle, and to provide means for the suppression and extirpation of pleuro-pneumonia and other contagious diseases among domestic animals," and of the act of Congress approved April 23, 1897, making appropriation for the Department of Agriculture for the fiscal year ending June 30, 1898, you are hereby notified that the contagious disease known as sheep scab, or scabies of sheep, exists among sheep in the United States, and that it is a violation of the law to receive for

transportation or transport any stock affected with said disease from one State or Territory to another, or from any State into the District of Columbia, or from the District into any State. It is also a violation of the law for any person, company, or corporation to deliver for such transportation to any railroad company, or master or owner of any boat or vessel, any sheep, knowing them to be affected with said disease; and it is also unlawful for any person, company, or corporation to drive on foot or transport in private conveyance from one State or Territory to another, or from any State into the District of Columbia, or from the District into any State, any sheep, knowing them to be affected with said disease. All transportation companies and individuals shipping, driving, or transporting sheep are requested to cooperate with this Department in enforcing the law for preventing the spread of the said disease. Inspectors of the Bureau of Animal Industry are directed to report all violations of this act which come to their attention.

In order to more effectually accomplish the object of the above-mentioned laws, it is hereby ordered that any railroad cars, boats, or other vehicles, which have been used in the transportation of sheep affected with said disease, shall be immediately cleaned and disinfected by the owners or by the transportation companies in whose possession said cars or vehicles may be at the time the animals are unloaded, by first removing all litter and manure which they contain, and then saturating the woodwork with a 5 per cent solution of crude carbolic acid in water. Inspectors of the Bureau of Animal Industry are directed to see that this order is carried into effect.

JAMES WILSON, *Secretary*.

#### NOTICE OF ENFORCEMENT OF THE LAW.

These orders constitute the notice as to the existence of the disease, and call the attention of transportation companies, stockmen, and others to the provisions of the law. Any one who violates this law or the regulations made in accordance therewith will be subject to the penalty, and can no longer plead ignorance or lack of notice. Owing to an insufficient number of inspectors during the past years, the Department has not been as active in seeking out and prosecuting offenders against this statute as the importance of the matter demands. There have undoubtedly been many shippers, as well as transportation companies, who have rendered themselves liable to prosecution and who have not been proceeded against, but it should not be concluded that, because the penalty has been escaped in a few instances, this immunity will continue. The inspection force is now competent to deal with this subject, and the Department of Agriculture will hereafter take such steps as may be required to stop the dissemination of this contagion through the channels of interstate commerce. In such action the Department will have the assistance and cooperation of all good citizens, and particularly of all of those who are interested in the sheep industry. There is probably no disease in this country, with the exception of hog cholera, which causes greater losses among the domestic animals than does sheep scab, and at the same time none which is so easily, cheaply, and certainly cured. It is, therefore, discreditable to the intelligence and practical qualities of our people that this contagion should still be rampant and continually distributed through the channels of commerce.

All sheep owners who expect to ship or drive their sheep across State



lines should assure themselves before the animals are started that scab does not exist among them. In case symptoms of the disease are discovered, the animals should be dipped and cured before they leave the farm. The information in this bulletin is sufficient to enable anyone to cure this disease with a minimum of trouble and expense. There will hereafter be no excuse for those who claim that they are unacquainted with the nature of the disease or with the methods of treatment.

#### EFFECT OF MEAT-INSPECTION REGULATIONS.

Sheep suffering from scab are affected by the meat-inspection law and regulations, as well as by those mentioned above. Section 6 of these regulations provides as follows:

6. The inspector in charge of said establishment shall carefully inspect all animals in the pens of said establishment about to be slaughtered, and no animal shall be allowed to pass to the slaughtering room until it has been so inspected. All animals found on either ante-mortem or post-mortem examination to be affected as follows are to be condemned and the carcasses thereof treated as indicated in section 7:

- (1) Hog cholera.
- (2) Swine plague.
- (3) Charbon, or anthrax.
- (4) Rabies.
- (5) Malignant epizootic catarrh.
- (6) Pyæmia and septicæmia.
- (7) Mange, or scab, in advanced stages.
- (8) Advanced stages of actinomycosis, or lumpy jaw.
- (9) Inflammation of the lungs, the intestines, or the peritoneum.
- (10) Texas fever.
- (11) Extensive or generalized tuberculosis.
- (12) Animals in an advanced state of pregnancy or which have recently given birth to young.
- (13) Any disease or injury causing elevation of temperature or affecting the system of the animal to a degree which would make the flesh unfit for human food.

Any organ or part of a carcass which is badly bruised or affected by tuberculosis, actinomycosis, cancer, abscess, suppurating sore, or tapeworm cysts must be condemned.

Instructions have been issued to inspectors to rigidly enforce these regulations. Sheep in an advanced stage of scab are feverish and unfit for food, and their carcasses will be condemned. Shippers who forward animals for slaughter in this condition will be likely to lose heavily upon them, as they will be subject to quarantine and condemnation. This is an additional and important reason for curing affected animals before they leave the feeding place.

Failure to observe the laws and regulations as they relate to this disease will in many cases result in hardship and loss. In order to avoid such unpleasant results so far as possible and to facilitate the control of the disease this article has been prepared. It is believed that there has been brought together herein all the information needed by the sheep owner to successfully combat this scourge of American flocks.



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U. S. DEPARTMENT OF AGRICULTURE.  
BUREAU OF ANIMAL INDUSTRY.

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PROCEEDINGS  
OF THE  
SECOND ANNUAL MEETING  
OF THE  
ASSOCIATION  
OF  
EXPERIMENT STATION VETERINARIANS,

HELD AT

**OMAHA, NEBRASKA,**

*September 8, 1898.*



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## LETTER OF TRANSMITTAL.

U. S. DEPARTMENT OF AGRICULTURE,  
BUREAU OF ANIMAL INDUSTRY,  
*Washington, D. C., November 11, 1898.*

SIR: I transmit herewith a record of the proceedings, with accompanying papers, of the Association of Experiment Station Veterinarians, held at Omaha, Nebr., on September 8, 1898, and recommend its publication as a bulletin of this Bureau.

The Association of Agricultural Colleges and Experiment Stations, the Association of Official Agricultural Chemists, and the entomologists of the experiment stations have been organized for several years, and their proceedings have been published by this Department. That rapid and beneficial progress has been the result of such cooperation is beyond question. The veterinarians recognize this fact, and a few who are especially interested have put forth efforts to effect a similar organization. It is believed that the nucleus already formed will grow into an organization which shall not only be of service to the several States, but be helpful as well to the General Government in cooperating, as necessity may arise, with the Bureau of Animal Industry.

Respectfully,

D. E. SALMON,  
*Chief of Bureau.*

Hon. JAMES WILSON,  
*Secretary.*





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# PROCEEDINGS OF THE SECOND ANNUAL MEETING OF THE ASSOCIATION OF EXPERIMENT STA- TION VETERINARIANS, 1898.

The Association of Experiment Station Veterinarians met in its second session in the Millard Hotel, Omaha, Nebr., on September 8, 1898. The following named members were present:

## MEMBERS PRESENT.

J. W. Connaway, Missouri Agricultural College Experiment Station, at Columbia.

James Law, Cornell University Agricultural Experiment Station, at Ithaca, N. Y.

C. A. Cary, Agricultural Station of the Agricultural and Mechanical College of Alabama, at Auburn.

S. B. Nelson, Washington Agricultural Experiment Station, at Pullman.

A. T. Peters, Agricultural Experiment Station, at Lincoln, Nebr.

M. H. Reynolds, Agricultural Experiment Station at the University of Minnesota, at St. Anthony Park.

D. E. Salmon, Chief of the Bureau of Animal Industry, United States Department of Agriculture.

M. Stalker, Iowa Agricultural Experiment Station, Ames.

## NEW MEMBERS.

New members were elected as follows:

S. S. Buckley, Maryland Agricultural Experiment Station, at College Park.

Paul Fischer, Kansas Agricultural Experiment Station, at Manhattan.

W. C. Langdon, North Dakota Agricultural Experiment Station, at Agricultural College.

F. L. Russell, Maine Agricultural Experiment Station, Orono.

## NEW OFFICERS.

Officers for the ensuing year were elected as follows:

President, James Law.

Vice-President, J. W. Connaway.

Secretary-Treasurer, A. T. Peters.

Executive committee: M. Stalker, A. W. Bitting, and M. H. Reynolds.

The Secretary, reporting for the past year, expressed gratification at the work done by the association. There was more cooperation among the stations than heretofore, and good feeling prevailed.

Changes among the veterinarians of the various stations were noted, as follows: N. S. Mayo, who resigned from the Kansas Experiment Station, is now with the station at Storrs, Conn. The position at Storrs was vacated by G. A. Waterman, who is now with the station at Lansing, Mich. A. A. Grange resigned from the Michigan station and is now connected with the Detroit College of Medicine in its veterinary department. The position vacated by S. B. Staples at Baton Rouge, La., is now occupied by W. H. Dalrymple. Paul Fischer is now located with the station at Manhattan, Kans. W. B. Niles resigned from the Iowa Agricultural College, at Ames, and J. A. Craig has been selected as his successor.

Papers read before the association follow herewith.

## GROWING TUBERCLE BACILLI FOR TUBERCULIN.

By C. A. CARY, B. S., D. V. M.,

*Veterinarian, Agricultural Experiment Station, Auburn, Alabama.*

It is not the purpose of this article to project new ideas or discoveries, but rather to make a few suggestions.

In order to make tuberculin one must first secure a pure culture of tubercle bacilli. This may be done by procuring a pure culture from some one who has it, or by isolating the bacilli from a tuberculous animal or man. The latter method should be adopted, because the former leads to lazy habits and inexperience. Secure some fresh tuberculous sputum; wash some of its solid or albuminous particles through six to ten changes of sterilized distilled water; inject one or more of these particles into the peritoneal sac of a guinea pig, a rabbit, or a house mouse. In three or four weeks and before the animal dies of the disease, kill it and from the spleen and liver carefully inoculate several of the ordinary blood serum tubes and of Löffler's blood serum mixture tubes. Keep these tubes in the incubator at 37.5° C., and in twenty to thirty days the characteristic pure-culture growth will be observed in some of the tubes. Other tubes may exhibit no growth, and still others may show growths of other germs.

A large stock of neutral glycerin bouillon should be kept on hand. It is best to make this bouillon from veal or with beef from an animal less than one year old. However, the most essential thing in preparing this bouillon is that it should be neutral in reaction. This is most accurately secured by titrating a 0.4 per cent solution of sodium hydrate into 10 cc. of the bouillon to which has been added a drop of an alcoholic solution of phenolphthalein. The 10 cc. of bouillon



should be taken from the bouillon mixture after it has been heated and the coagulated albuminous materials have been removed by filtration. Then the delicate rose color, which indicates the neutral stage will be readily observed. After making the calculation, neutralize the acidity in the bouillon by adding the proper quantity of an 8 per cent solution of sodium hydrate. After neutralizing, the bouillon should be cooked and filtered again. This method was first used by Schulz, and is described in full by Abbott in his "Principles of Bacteriology."

After the bouillon has been neutralized and sterilized, put it into large, flat-bottomed Erlenmeyer or antitoxine flasks, sterilize again, and then inoculate with tubercle bacilli. Some authorities recommend floating a small quantity of the dry bacilli from an old agar-agar culture upon the surface of the bouillon, but this is very difficult. I find that it is just as efficient to take upon the platinum wire some of a moist growth of the tubercle bacilli and rub them over the inside surface of the flask on a level with the top or upper surface of the bouillon. It is best and easiest to inoculate a small Erlenmeyer flask of bouillon as suggested above; and when a thin film has formed over the surface, small pieces of the film may be lifted out with a hooked platinum wire and they will readily float upon a bouillon surface.

After the cultures have grown at a temperature of  $37.5^{\circ}$  C. for six or eight weeks, heat in steam sterilizer for 15 minutes; run through sterilized filter paper; then pass it through a Pasteur-Chamberlain air pressure filter or any good filter that will remove all of the germs. The filtrate may be evaporated on a water bath to one-tenth of its original volume, and the result will be the strong, or concentrated, form of tuberculin Kochii. This form keeps better or longer than any other. One-half to 1 per cent of carbolic acid may be added to the filtrate and the tuberculin will keep for some time. It will have the regular strength, and be ready for use without requiring any changes. To the filtrate may be added an equal quantity of pure glycerin; this will preserve it by preventing the growth of accidental infection, but will make it one-half as strong as the normal, or regular, tuberculin. This last method has not been tried sufficiently to warrant the writer in recommending it in preference to the well-tried methods.

## FEEDING WILD PLANTS TO SHEEP.

By S. B. NELSON, D. V. M.,

*Professor of Veterinary Sciences, Washington Agricultural College and School of Science.*

For many years past there have occurred in the State of Washington, when sheep were being moved from winter quarters to summer pastures, serious losses in the flocks. According to the statements of the various sheep owners these losses have occurred in certain definite localities in the spring, but not in the autumn, when the sheep were returned to their winter feeding quarters. These fatalities happening under apparently the same conditions—at the same time and place each year—led the sheep owners to believe that the deaths were due to eating some grass or weed which acted as a poison to the sheep. This condition was brought to the attention of the Experiment Station and certain members commenced the work of investigating the cause of the great mortality in the flocks. As these experiments are not completed, it is not the intention of this paper to discuss the cause of the death of the sheep, but to record the results of feeding to sheep different plants, many of which have been and are considered poisonous to sheep and other domesticated animals.

The station botanist went into these various localities and ascertained what plants were there. About thirty-five different plants were observed, and as many as possible of these were fed and the results noted. The plants found were grouped into two classes: First, those from which might be expected a positive result; second, those from which a negative result might be looked for—judgment on both classes being based on public opinion about many of the plants; and also consideration being given to the abundance with which the plants were distributed. Following is the list of plants collected:

Class 1.—*Delphinium menziesii*, *Castilleja pallescens*, *Crepis barbigera*, *Astragalus dorycnoides*, *Astragalus spaldingii*, *Astragalus palousensis*, *Zygadenus venenosus*, *Frasera albicaulis*, *Antennaria luzuloides*, *Sisyrinchium grandiflorum*, *Arnica fulgens*.

Class 2.—*Saxifraga integuifolia*, *Lupinus ornatus*, *Leptotænia multifida*, *Peucedanum grayii*, *Synthyris rubra*, *Clematis douglassii*, *Heuchera glabella*, *Lithospermum pilosum*, *Geranium*, *Potentilla*, *Eriogonum heracleoides*, *Geum triflorum*, *Grindelia nana*, *Chænactis douglasii*.

## DELPHINIUM MENZIESII.

The first, and which was thought the most important, was *Delphinium menziesii*. Three sheep were used in this experiment. Prior to the experiment they had been kept in a lot where there was running water and were fed timothy hay.

*Experiment No. 1.*—May 17: At 4:30 p. m., sheep No. 1, a ewe, was tethered in a patch where *Delphinium* was very plentiful. She was returned to the stable at 8:30 p. m. There was evidence that she had eaten the blossoms of a few *Delphinium*. The next day she was placed in the patch at 5 a. m. and returned to the stable at 8 p. m. Besides the plants that she had cropped, there was given to her about 1 pound of gathered *Delphinium* plants, which she ate. On May 19 she was again tethered in the patch and given, in addition to the amount she obtained there, 1 pound of *Delphinium*. This was repeated on May 20; but she had only one-half pound of the gathered plant. She had, however, eaten everything within her reach except some scattered plants of *Brodia douglasii*. The following day she was staked out in a fresh place. She once in a while bit off the heads of the *Delphinium*, but did not seem to prefer it; however, by the evening she had eaten all the green material within the reach of her tether except the *Brodia douglasii*. May 22: She was tethered in a fresh place at 5:30 a. m., and by 9 a. m. she had eaten all the grass and *Delphinium* within her reach. On the 23d and 24th she was all right. Here we have an experiment in which a sheep is kept tethered in a patch of *Delphinium* for six days, and she ate all of the plant that she could obtain and was fed  $2\frac{1}{2}$  pounds besides, with a negative result.

*Experiment No. 2.*—This sheep was placed in a small pen, and on May 18 was given 5 pounds of *Delphinium*, consisting of stems, leaves, flowers, and unripe pods. May 19: He had eaten all that was given him yesterday. May 20: At noon he was given  $2\frac{1}{2}$  pounds of *Delphinium* that was gathered on the 18th. Probably considerable of the plant's water had evaporated; how much, I do not know. In  $2\frac{1}{2}$  hours he had eaten nearly all of it, and at this time was fed 5 pounds that had just been picked. The next day he had eaten all that had been given him the day before. He was given 3 pounds that was partially dried. It had been picked 24 hours. Four hours later he had eaten the 3 pounds and was then given 7 pounds just gathered. May 22: Removed  $1\frac{1}{4}$  pounds that he had not eaten. He was given  $3\frac{1}{2}$  pounds 24 hours old. The next day it was all eaten. May 24 and 25: He was well and the experiment was ended.

This sheep was fed, in 5 days,  $24\frac{3}{4}$  pounds of *Delphinium*, of which  $15\frac{3}{4}$  pounds were freshly gathered,  $6\frac{1}{2}$  pounds 24 hours old, and  $2\frac{1}{2}$  pounds 48 hours old. All this with a negative result. Certainly

this was more of the plant than a sheep would possibly gather on the range in the same length of time. During these 5 days he had nothing else to eat, subsisting wholly on *Delphinium*.

*Experiment No. 3.*—This was intended as a check on experiment No. 2; but this sheep did not eat the plant so readily. It consumed during the 5 days only  $6\frac{1}{4}$  pounds. The result, however, was also negative.

These experiments certainly are strong evidence that *Delphinium menziesii*, at least when eaten fresh at this time of the year, is not poisonous to sheep.

#### CASTILLEJA PALLESCENS.

This plant was looked upon with distrust as being poisonous, for the reason that it occurs only in a few places in the State in abundance, and these places were where the sheep often died. Two sheep were used in this experiment, which began May 26. Fed to the first  $1\frac{3}{4}$  pounds of Castilleja. The next day it was observed that he had eaten only a little, but he was given, in addition, the same amount as before. May 26: Only a little eaten. May 29: Nearly all eaten. May 30: All was consumed. In 4 days he ate  $1\frac{1}{2}$  pounds of the plant. On May 30, the second sheep was fed 2 ounces of Castilleja, which he ate immediately.

The results of both of these experiments were negative.

#### CREPIS BARBIGERA.

We were informed by a party very much interested in this matter that years ago he had seen *Crepis barbigera* fed to sheep with fatal results. I therefore looked for positive results from these trials. Two sheep were used.

May 26: There were fed to the first one 2 ounces of *Crepis*. The next day he had not eaten all of it. May 28: It was all eaten and he was given one-half pound, which was eaten by the following day. June 23: The second sheep was fed  $1\frac{3}{4}$  pounds of *Crepis barbigera*, which he ate as if he relished it.

Nothing detrimental to the sheep resulted from either experiment.

#### THE ASTRAGALI.

These plants have at various times been suspicioned of causing trouble in our domestic animals. We used the three following species: *Astragalus spaldingii*, *A. palousensis*, *A. dorycnoides*. Of *Astragalus dorycnoides*,  $5\frac{1}{2}$  ounces were fed May 26. Of *A. spaldingii*, 12 ounces were fed June 3, and again to the same sheep were given  $1\frac{1}{4}$  pounds on June 8, five days later. June 9:  $2\frac{1}{2}$  pounds of *A. palousensis* were fed to the third sheep. These sheep



ate the various amounts given them during the night following without any ill effects resulting. Could these experiments have been continued for a longer period of time, it may be that pathological changes would have followed the continuous feeding.

#### ZYGADENUS VENENOSUS.

This plant is called "poison camas" by the Indians, and it is reported that the eating of the bulb has caused death in the human family. On May 31, June 1 and 2, a sheep was fed  $1\frac{1}{2}$  ounces daily. He would eat them from the hand with apparent relish. However, his appetite was kept sharpened so that he would eat almost anything. June 4: Fed to this sheep 1 pound of the plant, both in blossom and in fruit. This amount was all eaten during the night. The sheep remained well.

#### FRASERA ALBICAULIS.

This beautiful plant was next tried on one sheep. June 3: He was fed  $1\frac{1}{2}$  pounds, which he ate before next morning. June 5: Fed to him 5 pounds, of which he ate about one-half during the night. By the 8th he had eaten nearly all. On this day he was fed three-fourths pound more, which was 4 days old. He ate this last amount during the night. In all he received  $7\frac{1}{4}$  pounds without any apparent injury.

#### SISYRINCHIUM GRANDIFLORUM.

The plants of this species that were fed were 4 years old and about 20 of these stalks were fed. The sheep ate them out of the hand. Result, negative.

#### ANTENARIA LUZULOIDES.

Three pounds were gathered and fed to one sheep. It was all eaten in less than 24 hours, without any visible bad results.

#### ARNICA FULGENS.

This was the last plant in this class to be used. Fed to a sheep 2 pounds of the plant that had been gathered 18 hours. The material was all eaten during the day. Results, entirely negative.

This closed the experiments with those plants from which we had some reason to obtain some clearly visible physiological effects. There was fed of the different plants from one-eighth to 7 pounds in one day.

In the second class the following were fed and eaten in about 6 hours' time: *Saxifraga integrefolia*, 7 ounces; *Leptotaenia multifida*  $1\frac{3}{4}$  pounds; *Grindelia nana*, 2 pounds; *Chaenactis douglassi*,  $1\frac{1}{2}$  pounds. No poisonous symptoms followed.

## LUPINUS.

On May 30, there was fed to a sheep  $1\frac{1}{4}$  pounds at 11 a. m.; at 6 p. m. it was all consumed. The next day he was given  $2\frac{1}{2}$  more pounds, which he ate greedily. June 1: That amount was doubled, giving him 5 pounds; this he consumed by the next day. This sheep was fed  $8\frac{1}{4}$  pounds in a few hours less than three days. No untoward effects resulted.

## PEUCEDANUM GRAYII.

On May 31 I fed  $1\frac{1}{8}$  pounds of this stinking plant, having much doubt that the sheep would eat it. The following morning it had, however, all disappeared. Two days later he was fed at one time 4 pounds, which he ate by the following morning. The sheep showed no ill effects from it.

The following five plants were fed to five different sheep: *Clematis douglasii*, 4 pounds; *Lithospermum pilosum*, 4 pounds; Geranium,  $3\frac{1}{2}$  pounds; Potentilla, 4 pounds; and *Eriogonum heracleoides*,  $3\frac{1}{2}$  pounds. Each sheep ate his allowance in less time than one day and showed no ill effects whatever from it.

Of the next three plants, a smaller amount was given: *Synthyris rubra*, 1 pound; *Heuchera glabella*,  $1\frac{1}{2}$  pounds; and *Geum triflorum*, three-fourths pound. The sheep took nearly 24 hours to eat this, and the result again was negative.

In these experiments from three-fourths to 4 pounds of the various plants were fed in one day without appreciable effect on the sheep.

In conclusion, I wish to acknowledge the valuable advice and assistance of the station botanist, C. V. Piper, in carrying on these experiments.

## THE EXPERIMENT STATION VETERINARIAN AS A MEMBER OF THE STATE BOARD OF HEALTH.

By M. H. REYNOLDS, D. V. M., M. D.,

*Veterinarian, Agricultural Experiment Station of the University of Minnesota.*

It is unfortunate that there is not greater uniformity in methods of controlling infectious diseases among domestic animals. Some States have adopted the plan of a State veterinarian, assisted by local deputies, the State veterinarian having little or no connection with the State board of health, while other States are trying to control infectious diseases among domestic animals through boards of live stock commissioners. Some States have a State veterinarian working on very meagre salary, and other States have State veterinarians who are nongraduates and who are given considerable authority. And still other States are trying to control these diseases by means of official titles; that is, they have officers and titles, but these offi-

cers are practically without funds and without sufficient authority.

In Minnesota all police authority concerning infectious diseases of animals is vested in the State board of health. Until January 1, 1897, this board was composed exclusively of physicians. For a great many years Minnesota's State board of health presented the strange combination of a board composed exclusively of practitioners of human medicine, having absolute authority concerning infectious diseases of domestic animals. During this time the gentleman who held the position of Experiment Station veterinarian was expected to visit outbreaks and accomplish marvelous things in the way of checking infectious diseases without any authority. This situation and the results of this method did not prove satisfactory to our stock interests. Stockmen made such vigorous objections during the winter and spring of 1896 and 1897 that the governor decided to appoint a veterinarian to membership on the State board of health. After due consideration he appointed the Experiment Station veterinarian. This is the present situation in our State. Possibly another veterinarian may be appointed to membership on the board in the future, and then the work will be divided more nearly as it should be.

Our newly appointed member of the State board of health was soon made chairman of the committee on infectious diseases of animals and given immediate charge of the correspondence and general office work pertaining to that work. After about six months of this work, he was made director of a newly created veterinary department. This divided the work of the board into three parts—that of the secretary and general executive officer, the bacteriological laboratory in charge of a director (and, by the way, we have a laboratory and bacteriologist in connection with this work in Minnesota, of which we are proud), and the veterinary department. Rules which partly define the duties and authority of the Director of the Veterinary Department have been adopted as follows:

#### RULES CONCERNING WORK IN THE VETERINARY DEPARTMENT.

1. The Director of the Veterinary Department shall have the privilege of proposing such circulars and rules as he may deem necessary for the purpose of defining the policy of the board with reference to the veterinary work of the board. Such circulars and rules shall be submitted to the executive committee or to the State board of health for approval.

2. The Director shall conduct the correspondence dealing exclusively with veterinary matters. He shall have the necessary police authority to enable him to order quarantine when in his judgment such course shall become necessary. He shall have authority to use his judgment in releasing quarantine in unusual cases, independent of the rules governing quarantine.

3. All agents and employees doing veterinary work in the field shall report to the Director, and it shall be the duty of the Director to furnish the Secretary with such summaries of regular work and with such other information as the Secretary may need.

4. It shall be the duty of the Director to refer such matters as violation of the law dealing with infectious diseases of animals, general enforcement of said law, and indifference and carelessness of local health officers, to the Secretary for action.

5. It shall be the duty of the field veterinarian to investigate outbreaks of infectious diseases among domestic animals, when deemed advisable by the Director of the Veterinary Department, and to attend to such experimental and other veterinary work as may seem necessary. When not doing field work, it shall be his duty to assist the Director in correspondence and other office work.

6. The field veterinarian shall have authority to order quarantine, to kill and release quarantine of domestic animals, in accordance with the rules and recognized methods of the State board of health.

7. It is hereby declared the policy of the State board to pay the salary and furnish transportations for the field veterinarian. Local boards are expected to pay all his other legitimate expenses incurred in work for them.

The work of the Veterinary Department has grown rapidly in all directions. During the last year we employed one field veterinarian. This spring we added another. Thus, you see, we have one veterinarian as a member of the State board of health and two others engaged in the field work of the board. One of these field veterinarians devotes his entire time to hog cholera; the other does miscellaneous work, going to outbreaks of any disease of unusual importance, to outbreaks where there is dispute among different veterinarians who have been called by owners and local boards, and to places in the State where there are no competent veterinarians.

Perhaps I should explain that in Minnesota we expect the local board to employ in ordinary cases a local veterinarian and take care of their own outbreaks of infectious diseases among domestic animals under the direction, of course, of the State board. The law requires that local health officers shall report to the State board of health within 24 hours after receiving information of an infectious disease.

During the four years of my work as an Experiment Station veterinarian before my connection with the State board of health, I was constantly crippled for lack of police authority. An Experiment Station veterinarian is usually expected to visit outbreaks, make diagnoses, and write prescriptions, and then he is severely blamed because the outbreak of glanders or anthrax, or possibly sheep scab, does not promptly abate. During this time I could give such information and advice, and write such prescriptions, but had no authority to insist on anything. If I did this kind of work for the State board of health, the Station received no credit.

On the other hand, the State board of health veterinarian or State veterinarian, as the case may be, who has no connection with an Experiment Station, is very apt to be crippled for lack of opportunities and funds for investigation. For instance, he visits an outbreak



of disease that affords a very peculiar and unusual history. The trouble may be due to faulty conditions of the feed, but he is unable to make a careful investigation and gather satisfactory information as to the cause and nature of the trouble, perhaps for lack of funds for such work.

An Experiment Station veterinarian, who is also a State board of health veterinarian or State veterinarian, has splendid opportunities for collecting material, for doing a great variety of experimental work and keeping accurate records with very little expense to the station. He can collect an abundance of material for almost any sort of experimental work, almost without expense to the station. This is especially true if he has access to a well-furnished bacteriological laboratory.

Another advantage is that such an arrangement brings about a hearty cooperation between two great institutions which might otherwise be working separately and more or less fruitlessly in the same field, each one's work incomplete without the data which the other could furnish. By the way, I might suggest that in Minnesota this plan of cooperation, especially in matters of agricultural interest, is in quite general and happy operation. For instance, our State University, including our Agricultural College and School of Agriculture, our Experiment Station, and State Farmers' Institutes, are all intimately associated in their work, partly because the regents of the University and Experiment Station are influential members on the Board of Control of the State Farmers' Institutes. Our State Fair Grounds adjoin the Experimental Farm; and there is the closest possible cooperation between the State Agricultural Society, Minnesota Stock-Breeders' Association and the Experiment Station with its congeners, the College and School of Agriculture and the State Farmers' Institutes. The Experiment Station veterinarian is also director of the veterinary department of the State board of health.

We find cooperation between the veterinary work of the Experiment Station and the State board of health to be very satisfactory. We found the work unsatisfactory before such combination was made. So long as we had one authority in the State who had charge of infectious diseases, and another who worked in both parts of this field but had no police authority over infectious diseases, the work for each outbreak was more or less tangled.

Owing to the way in which the work is organized in Minnesota, outbreaks of infectious diseases among domestic animals are discovered and reported by the local health officer to the State board. If the outbreak is such that it can be taken care of by the local health officer or by a representative of the State board of health, and all that is needed is a little police authority, it does not necessarily involve the station work at all. On the other hand, if it is work that

invites investigation, the Experiment Station furnishes materials and means for such work, and finally, if it is thought best, publishes and distributes the results of such investigations.

If representatives of the State board of health and Experiment Station go into the legislature together and ask for an appropriation or modification of existing laws, they are apt to be successful.

Correspondence and other office work of the veterinary departments of the two institutions can be greatly economized by cooperation. There is needed only one set of office records and one official head for the two departments. Although there may be a large correspondence and an immense amount of office records and files to look after, the work can be so planned that one office assistant does this work for both. In our State the Experiment Station permits me to use a portion of my time for the State board of health work on the ground that I would have to do a great deal of this work whether connected with the State board of health or not. The office assistant and stenographer does all my correspondence and keeps Station records, although her salary is paid by the State board of health.

By this cooperation we avoid a great deal of duplicating, which would otherwise be unavoidable. For instance, I write a small bulletin on hog cholera and swine plague for the Experiment Station; after it has been distributed by the Experiment Station, I condense it into a small circular for use in the State board of health work.

Let me say, in conclusion, that I hope that the work of this association will aid in bringing about greater uniformity and closer cooperation between our various States; and when this work is organized as it should be every State will have one or more veterinarians on the State board of health, and the Station veterinarian will be ex officio a member of that board.

## LABORATORY RECORDS FOR VETERINARIANS.

By A. W. BITTING, D. V. M.,

*Veterinarian, Agricultural Experiment Station of Indiana.*

One of the first essentials in research work is the adoption of some system of keeping records. It matters little what system is used if it possesses the merit of convenience and clearness in giving the information desired. Some stations have a common method of reporting for all departments. Some utilize blank forms, which are filled out each day and filed. Others keep the records in books of uniform style, while a few have no fixed method, but trust to reporting each experiment by itself.

A method which commends itself to those who have used it is the card-index system, because of its adaptability to so many kinds of reports. It is the only convenient system that can be employed in keeping a bibliography of the special subjects under investigation. It requires but a few hours to catalogue all the articles in the veterinary journals each month and probably only a few minutes to index the special articles relating to the subjects under study. I undertook the task of making a complete index of all the English periodical veterinary literature. The journals indexed are *The Veterinarian*, *The Veterinary Journal*, *The Edinburgh Veterinary Review*, *The Veterinary Record*, *The American Veterinary Review*, *The Journal of Comparative Medicine*, *The Veterinary Magazine*, and the *Journal of Veterinary Science in India*. The number of cards now in the index is over 50,000, and it will require about 12,000 more to bring the work up to the close of 1898. While this index is of great convenience and value, I could not recommend anyone to attempt to duplicate it, as the work is several times greater than is anticipated. If a few stations need such an index, it would be far more convenient to have a printed copy made from this one than to duplicate the work. I believe, in general, it will be found to be profitable to index only special subjects, although all will admit the use and desirability of having a complete index. In making a bibliographical index the same style should be used as followed by public libraries.

The card index is the most convenient form of recording the presence and distribution of diseases in the State. The card should give the name of the disease, the locality, the time when reported, and the name of the person reporting it. The cards may be filed according to the disease reported or by counties to give the distribution.

The index is one of the best means for keeping a record of the equipment of the laboratory. The card should give the name of the article, of whom and when purchased, and the cost. When the article is broken or consumed the card may be removed and an inventory is always at hand. For recording staining reagents it should give the formula and date of preparation of each.

A card index serves as a convenient method of keeping certain laboratory notes. Examinations are frequently made of material out of the usual line of work and a brief record is all that is needed. Such a record upon a card may be filed and become useful at some future date when the subject is under consideration. Reports of cases may be filed in the same way. So far as possible it is best to use the large index cards, and for recording laboratory examinations or cases cards of usual height but double length.

## THE DESIRABILITY OF COOPERATION BETWEEN THE STATION VETERINARIAN AND THE LOCAL VETERINARIANS IN THE STATE.

By A. W. BITTING, D. V. M.,

*Veterinarian, Agricultural Experiment Station of Indiana.*

It may be possible to imagine an experiment station so well equipped and so liberally provided with funds that the veterinarian at the head of his department can use his discretion in the selection of the disease or the special problem for investigation; that he may go wherever the disease is present, stay as long as may be necessary to make a complete series of observations, or repeat his visitations until he has learned all that he can. In such a position he could be independent of public demands, and could utilize all his energy in prosecuting his work.

A veterinarian occupying a position in a State experiment station is confronted with a difficult set of conditions. The funds for maintaining this department are limited. He is usually compelled to make his studies upon outbreaks of disease and such sporadic cases as occur in the immediate vicinity of the station. If he visits localities at some distance from the station he is rarely permitted to have all the time that is necessary to complete the work or repeat his visitations because of exhaustion of the funds. Under the conditions existing at most of the stations the veterinarian can have at best only a small number of cases of any disease upon which to make observations or experiments. The public demands that he should be informed concerning the occurrence and distribution of contagious diseases, and in many instances that he shall give assistance in their suppression. Of all the members of the station staff he is the least independent. He can not order an outbreak of disease for his special study; he can not control the location or duration of the disease when one does occur; and he can obtain information upon the occurrence and distribution of contagious diseases in the State only through correspondence.

I believe the veterinary department of the experiment station and the veterinarians in the State should be on such friendly terms that cooperative work may be conducted to the advantage of both. The station can act as a medium to give the latest information upon the results of its own researches and announce the work that is being accomplished at other places. The station may also give assistance in diagnosis in certain cases where the microscope or other special equipment is necessary. The veterinarian, in turn, may be of great assistance to the station by reporting outbreaks of disease and the results of any experiments which he may undertake.



In 1896 and 1897 I made an attempt to determine whether cooperation was practical and whether the station would gain information to compensate for the work required. There were ninety-six qualified veterinarians in the State. A circular letter setting forth the plans and blanks for reporting the number of cases occurring in their practice each month were sent to each veterinarian. The list of diseases upon which reports were desired were those most common in the State. It included abortion (infectious) among mares and cows, actinomycosis, anthrax, cholera, glanders, influenza, rabies, specific ophthalmia among cattle, sporadic aphthæ, tetanus, tuberculosis, azoturia, colic, other intestinal diseases, parturient apoplexy, periodic ophthalmia, pneumonia, cerebro-spinal meningitis, bursatte, fistulæ, lameness, etc. At first I received about thirty-five replies, but the number gradually became smaller until only eight remained after the month of August. In 1897 I tried a different plan, and made my blank upon a postal card and distributed them at the end of each month. I sent the postal cards to about twenty-five addresses and had fifteen reports for each month of the year. At the close of the year there was much greater interest than at the beginning, and I feel certain that I could have doubled the number of correspondents. The work was abandoned, as I contemplated withdrawing from station work.

The time covered by this work is admittedly too short to draw conclusions from the reports, but they seem to indicate that certain diseases, such as tetanus and parturient apoplexy, are of far more common occurrence than is generally suspected; that certain diseases, such as fistulæ and bursatte, are common in some localities and rare in others; and that seasonal influences are less marked than is often asserted. The station received fifty-one species of parasites for identification and also a number of pathological specimens. At the suggestion of the writer several new preparations were used and reports received. The station supplied its own publications and gave notice of all bulletins upon veterinary science as they appeared at other stations and the Bureau of Animal Industry. Upon the whole the station was well repaid for its part of the work, and the veterinarians expressed the desire to have it continued.

One of the good effects that was wholly foreign to the original object was the increased interest which it developed in the State Veterinary Medical Society. At the first three meetings of the society which I attended, only seven or eight members were present. The three meetings held after the correspondence was established was attended by from twenty to thirty members.

## THE EXHIBIT OF THE UNITED STATES EXPERIMENT STATION VETERINARIANS AT THE PARIS EXPOSITION IN 1900.

By A. T. PETERS, D. V. M.,

*Investigator of Animal Diseases, Agricultural Experiment Station of Nebraska.*

I take pleasure in presenting a subject which ought to be of vital interest to every member of this association, namely, the veterinary exhibit of the United States Experiment Stations at the Paris Exposition in 1900. As is well known, at the convention of the Association of Agricultural Colleges and Experiment Stations, held in July, 1897, at Minneapolis, a committee upon a collective exhibit of the experiment stations at the Paris Exposition in 1900 was appointed, consisting of H. P. Armsby, M. A. Scovell, W. H. Jordan, A. W. Harris, and A. C. True. The committee has had a meeting in conference with Hon. James Wilson, Secretary of Agriculture, and the executive committee of the above association. As yet no appropriation has been made by Congress for such an exhibit, but the committee, as a result of their meeting, have seen fit to proceed with the preliminary arrangements. Mr. Armsby has written me regarding the exhibit of the Veterinary Department, and I have consented to bring the matter before this body for its careful consideration.

Mr. Armsby writes that "the committee desires to make in this exhibit a presentation of the origin, history, and work of the stations which shall be calculated to illustrate the essential and distinguishing features of the American system of experiment stations as compared with those of other countries. With this end in view, it is proposed to make the exhibit technical rather than popular in its nature, appealing to the expert and the administrator rather than to the farmer. In carrying out this plan, it is the intention to make use of two methods: First, it is intended to prepare a report which shall include a characterization of the work of the experiment stations along four main lines, namely: (a) Police and control work; (b) studies of natural resources and conditions; (c) demonstration on experiments; (d) scientific investigations. Second, based upon this report, it is desired also to make as attractive an exhibit as practicable of selected typical examples of experimental methods and results."

I have given this matter no little study, and the more thought I spend upon it the more perplexing becomes the question as to how we veterinarians can best show to the Old Country our unique way of investigating scientific problems. I believe this question can be settled right here at the meeting of experiment station veterinarians. And hence I have thought it advisable to offer this paper merely as an introduction to the discussion which I know you will enter into

heartily. The committee desires not "a complete and exhaustive report upon our work, nor a complete bibliography, but a characterization of the main lines and tendencies of our work, classified under the headings given above."

Concerning police and control work may be mentioned the work done by the experiment station veterinarians in aiding the Bureau of Animal Industry in formulating the best methods of controlling contagious diseases by quarantine regulations, sanitary measures, and vaccination. In this work what greater triumph have our foreign brethren scored than we have scored in preventing the spread of Texas fever to the Northern States by the quarantine laws, and in successfully eradicating pleuro-pneumonia in the United States; which latter fact will always be a source of great wonderment to foreign veterinarians, and which it will take scores of years for them to accomplish? Too much can not be said in regard to our work in eradicating sheep scab by the enforcement of sanitary measures and quarantine rules, when we consider how easy it is for it to spread unless the strictest laws are observed. Another thing that is characteristic of American veterinarians is the work done by the different States in controlling tuberculosis and glanders by the extensive use of tuberculin and mallein and the destruction of the diseased animals.

In demonstrating our experiments we shall be able to show that they are original and unique. Though not all have been successful, yet it must be admitted that a great per cent have been successful; in fact, a much larger per cent than is publicly known. And even those that have failed have in a way been stepping stones to higher scientific investigations. The veterinarians abroad who are unfamiliar with what we have done, and who have given us credit for so little, can, if we take advantage of this opportunity, be shown that our work ranks as high as theirs. This latter fact has never been conceded by them, but we must remember that the investigations and experiments of our veterinarians do not date back so far as do those of European investigators, and hence it becomes our opportunity to illustrate to them that our work of recent years compares surprisingly favorable with theirs. Personally, I believe that along certain lines our investigations even exceed those of our foreign brethren. To back this up I should like to call attention to American investigations in Texas fever as compared with the German investigations in Wildseuche and Büffelseuche, which are supposed to be the same as Texas fever.

Besides these researches, which have resulted in the discovery of the real cause of Texas fever, the movements of the little tick, and the best method of treatment and prevention, let me call attention to the work of the Bureau of Animal Industry and the experiment

stations in investigating hog cholera. In this country this investigation is undoubtedly foremost. As much as this may be said concerning actinomycosis and many other diseases too numerous to mention here.

I have pointed out to you only a few of the many distinguishing features that go toward characterizing the work of the United States experiment station veterinarians, and I am therefore in hopes that these few words of introduction will aid in bringing out from the members statements of just how and what we ought to exhibit before our foreign veterinarians.

The idea of the committee is to demonstrate in the report the characteristic investigations along the lines of the various diseases for which each station is noted. This should be prepared in a technical, concise manner, yet simple and practical enough to prove that no nation on earth has done more along these lines in recent years than has the United States agricultural experiment stations. For instance, this report should contain an outline of the work done, together with the results in the separate States, including police and control work, and laboratory and field investigations and experiments. The exhibit accompanying said report should consist of apparatus, specimens, statistics, and all materials used, thus making the report more practical and illustrative than otherwise.

To make such a showing possible, and in order to do justice to the United States experiment stations, it will require your entire cooperation in the matter; and allow me, in closing, to express the hope that you will each and every one enter heartily in assisting the committee to gather the material necessary to make the venture a success.

## THE VALUE TO VETERINARIANS OF COOPERATIVE EXPERIMENTS.

By L. L. LEWIS, M. S., D. V. M.,

*Veterinarian, Oklahoma Agricultural Station.*

As new as the Association of Experiment Station Veterinarians is, the subject of cooperative experiments is still newer so far as the station veterinarian is concerned. It is not to be expected that with so recent an organization there should be any definite understanding in regard to cooperative work, but to my mind there is no one thing more necessary to the advancement of the veterinarian's work than an organization of those interested in experimental work. Cooperative experiments will follow as a natural consequence of such an organization, but it is not the intention or province of this paper to favor any one plan of work, but rather to try to mention some of its advantages, hoping that sufficient interest will be taken in the subject to bring it before the next meeting in the form of a suitable discussion.



The station veterinarian's work is almost the only line of station work that is not to a certain extent cooperating with other stations for the purpose of securing more complete data on certain lines of work. The other departments of the station are getting better results by cooperative work, not only with other experiment stations, but also with the Department of Agriculture. The veterinarian should not be less ready to exchange views and ideas with his fellow worker than men engaged in other lines of work, and the more liberal is this exchange the surer of success.

I think there is no work better suited to such organization than the work of the veterinarian. The pathology and therapeutics of most of the contagious and infectious diseases can be as successfully studied in one part of the country as another, and by an exchange of data on the work, following a general plan or outline, some definite results will be secured in very much less time than by the present method where everyone works independently, repeating the mistakes of others and duplicating, it may be, a large amount of work. More data of a reliable nature could be secured in one year on any given subject by the cooperation of several stations than are now available in from two to five years.

It is not probable that very many of the stations will do very much work of this character in the immediate future. There has been some work of this character in the past two years and, so far as the writer knows, it is a satisfactory method of conducting experiments.

Where assistance can be given without interfering with the general plan of work it should be done if such a proposition be made. But the idea of cooperative work should not mean the sacrificing of one's ideas of method and manner of work; if it did, it certainly would be a failure.

A portion of the station veterinarian's time is occupied by teaching, as most of them are members of the teaching staff in the agricultural colleges. A large part of his time may be occupied by work conducted in the laboratory or routine in character, but aside from this work there is time to devote to field experiments or to laboratory work of a cooperative character.

I realize that a more able writer and a more experienced station worker should have been assigned to this duty, but I trust that by the time the next meeting is held there may be more stations interested in the work, as I believe that cooperation will increase the usefulness of the veterinarian's work in a scientific as well as a practical way.

## HISTORY OF THE ASSOCIATION.

The Association of Experiment Station Veterinarians is an outgrowth from the correspondence that sprung up in 1896 among various Experiment Station veterinarians who saw the necessity of such an organization. As a result of this correspondence, circular letters were sent out to all veterinarians of the United States Experiment Stations and Agricultural Colleges asking them as to the advisability of such a movement, and informing them that an attempt would be made to organize temporarily at the Buffalo meeting of the United States Veterinary Medical Association. In February, 1897, another circular letter was addressed to the same men stating that a temporary organization had been formed, in accordance with the plans, by Doctors Salmon, Stalker, Reynolds, Grange, Cary, Williams, Pearson, and Peters. It was the unanimous opinion of these gentlemen that an association of this character would be of great benefit to the station veterinarian. Accordingly, at the Nashville meeting of the United States Veterinary Medical Association in 1897, a permanent organization was effected, papers were read, permanent officers were elected, and a constitution and by-laws adopted.

The second annual meeting, the proceedings of which are herewith published, was held at Omaha with the United States Veterinary Medical Association on September 8, 1898.

# CONSTITUTION AND BY-LAWS OF THE ASSOCIATION OF EXPERIMENT STATION VETERINARIANS.

## CONSTITUTION.

### ARTICLE I.—NAME.

This Association shall be known as the Association of Experiment Station Veterinarians.

### ARTICLE II.—OBJECT.

The object of this Association is to bring the several veterinarians of the different Experiment Stations in a closer communication, to advance their common interests by the establishment of honorable and fraternal relations, and to secure the benefits of cooperation and united action in bringing into prominence the merits of scientific veterinary investigation.

### ARTICLE III.—MEMBERS.

All those who are connected with the U. S. Experiment Stations and Agricultural and Mechanical Art Colleges may, upon application and the payment of the initiatory fee, become members of this Association.

### ARTICLE IV.—OFFICERS.

Chapter 1. The officers of this Association shall consist of a President, Vice-President, Secretary-Treasurer, and three Trustees, who shall constitute the Executive Committee.

Chapter 2. The officers shall be elected for one year by ballot and hold office until their successors are elected.

### ARTICLE V.—THE EXECUTIVE COMMITTEE.

The Executive Committee shall manage the business of the Association under such regulations and restrictions as the Association may from time to time prescribe.

## BY-LAWS.

## SECTION I.

Article 1. The President shall preside over the meetings of the Association.

Article 2. He shall deliver an address at the annual meeting succeeding his election.

Article 3. He shall appoint all committees not otherwise provided for.

## SECTION II.

Article 1. The Secretary shall give due notice of the time and place of each annual meeting. He shall conduct all correspondence of the Association, retain copies, and report the same at each meeting.

Article 2. The Secretary shall also perform such other duties as may be imposed upon him by the Association.

## SECTION III.

Article 1. The Secretary-Treasurer shall collect all bills due the Association and give security for all moneys held by him if desired. He shall keep a correct account of the same, holding receipts for all disbursements. He shall furnish a statement of the funds of the Association at each annual meeting, or oftener if desired.

Article 2. He shall be the custodian of all moneys belonging to the Association, or donations, and keep a correct account of the same with the names of the donors, and report such members as have failed to pay their dues for one year.

Article 3. The Treasurer shall pay out no money from the treasury, or dispose of any money or property of the Association, without the knowledge and approval of the President. All bills audited by the Finance Committee shall be paid by the Treasurer upon the order of the President.

## SECTION IV.

Article 1. Order of business:

Roll call.

Reading of minutes of previous meeting.

President's address.

Reports of committees.

Admission of new members.

Unfinished business.

New business.

Election of officers.

Miscellaneous business.

Papers and discussions.



## SECTION V.

Article 1. Seven members shall constitute a quorum for the transaction of business at the annual meeting.

## SECTION VI.

Article 1. The annual dues shall be one dollar (\$1.00) and the secretary is instructed to levy a tax upon the members sufficient to cover any deficit that may occur.

## SECTION VII.

Article 1. Any proposed alterations or amendments to the constitution or by-laws shall be submitted in writing to each member of the Association at least three months before the next annual meeting.





U. S. DEPARTMENT OF AGRICULTURE,  
BUREAU OF ANIMAL INDUSTRY.

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THE SERUM TREATMENT OF SWINE PLAGUE  
AND HOG CHOLERA.

BY

E. A. de SCHWEINITZ, Ph. D., M. D.,

*Chief of Biochemic Division,*

WITH THE COLLABORATION OF MARION DORSET, M. D.,

UNDER THE SUPERVISION OF

D. E. SALMON, D. V. M.,

*Chief of the Bureau.*



WASHINGTON :  
GOVERNMENT PRINTING OFFICE.  
1899.





## LETTER OF TRANSMITTAL.

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U. S. DEPARTMENT OF AGRICULTURE,  
BUREAU OF ANIMAL INDUSTRY,  
*Washington, D. C., December 24, 1898.*

SIR: Laboratory investigations in the use of serum for treating hog cholera and swine plague have been carried on by this Bureau for several years, and with such favorable results that, upon your direction, the treatment was given an enlarged field in Page County, Iowa. The work conducted there during the season of 1897 showed that the treatment saved about 80 per cent of the animals injected. The results in 1898 have been exceedingly satisfactory and tend to confirm those of the previous year. So much interest has been manifested in this work that this article on the subject of serum treatment for hog cholera and swine plague has been prepared by Dr. de Schweinitz, who has been in charge of the work, assisted by Dr. Marion Dorset, and others, and its publication as a bulletin of this Bureau is recommended.

The public should be informed that the preparation of the serum by the Bureau is necessarily limited, and therefore its distribution is confined to inspectors for the Bureau and to experiment stations.

Respectfully,

D. E. SALMON,  
*Chief of Bureau.*

Hon. JAMES WILSON,  
*Secretary.*

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# THE SERUM TREATMENT FOR SWINE PLAGUE AND HOG CHOLERA.

By E. A. DE SCHWEINITZ, Ph. D., M. D.,  
*Chief of Biochemic Division.*

One of the most interesting and difficult problems which has engaged the attention of this Bureau for some years has been the discovery of a method or methods for the prevention or cure of diseases known as *hog cholera* and *swine plague* among swine.

## PRELIMINARY EXPERIMENTS.

In the year 1890 a study of the substances secreted by the hog cholera and swine plague germs was begun in the Biochemic Laboratory of the Bureau of Animal Industry by the writer of this article. From cultures of these bacteria he succeeded in isolating two substances albuminoid in character and others belonging to the group called amines, which produced, when injected into experimental animals, some of the characteristic symptoms of hog cholera or swine plague, respectively, and conferred upon these animals an immunity to subcutaneous inoculation with hog cholera and swine plague germs, respectively. The reports of this work were published in the Medical News of Philadelphia in September and October, 1890, and annual reports of this Department for 1890 and 1891.

A series of practical experiments was then carried on at the experiment station of the Bureau upon swine. The animals were injected with the products of the growth of these bacteria, including the contents of the cells themselves, as well as those products of excretion of the cells which were in solution in the culture liquid. In ten days after inoculation they were exposed to hog cholera and swine plague, respectively, by an intravenous inoculation with a virulent germ sufficient in quantity to kill the check animals in a week to ten days. In general these results were fairly satisfactory, in so far that, while the check animals died, about 50 per cent of the treated animals remained alive. The method of exposure, however, was unsatisfactory, as it was not always possible to be certain that the checks would die, and in a good many cases the exposure of the treated animals by this method of inoculation was very much more severe than that which they would in all probability have been subjected to in the field. In addition, the injection of these products of the bacilli produced disagreeable local lesions in the animals.

While the results of the work showed that considerable immunity to these diseases could be secured by this method of treatment, it did not appear practicable for field work, and consequently other laboratory investigations were begun.

A more thorough study of the substances produced by the hog cholera germs, the results of which were published in the Philadelphia Medical News of October, 1892, showed that if the cultures of this germ were made upon milk or other suitable media, it was possible to obtain from these cultures a small quantity of enzymes, or soluble ferments. These ferments secreted by the hog cholera bacillus were also tried for the purpose of producing immunity in experimental animals, with satisfactory results. The injection of quantities of these ferments below 0.01 of a gram was without ill effect. If the amount injected was increased beyond this point there was a rise of temperature in the animals for several days, and in several instances 0.05 of a gram was sufficient to kill the animals. A single injection of guinea-pigs with 0.04 of a gram of the ferments served to make the animals immune to an inoculation with the hog cholera germ that was sufficient to cause the death of the checks in ten days. In the article referred to the opinion was expressed that the soluble ferments exert a very potent action in rendering animals insusceptible to disease, and that to the indirect action of the specific ferments secreted by the hog cholera and other germs the protective and curative influence of blood serum from immune animals may be traced, as well as the immunity produced by injecting animals with cell contents or the products of the cell growth. At about that time the writer published an article in the Philadelphia Medical News, September 24, 1892, upon the production of immunity in guinea-pigs to hog cholera by the use of blood serum from other guinea pigs that had been previously immunized. The guinea-pigs used as a source for the blood serum were immunized by means of the cell contents and products of the growth of hog cholera bacilli, and after they had withstood an inoculation of the germ of sufficient virulence to cause the death of the checks they served as a source of serum to be used for injecting other healthy guinea-pigs or for treating guinea-pigs infected with hog cholera. The results of these experiments were also satisfactory, but for various reasons they could not be pushed as rapidly as desired. The experiments were continued, however, in a quiet way, and the use of the products of other bacteria allied to the hog cholera germ, as the *Coli communis*, etc., were tried. The results were satisfactory for the purpose of securing immunity to hog cholera. As stated in one of the papers mentioned, it is probable that all gas-producing bacilli secrete a soluble ferment, and that this ferment is of considerable importance in connection with the production of immunity. While it is not probable that each germ gives rise to a distinctive ferment, it is probable that different germs secrete two or more ferments, and that the combined action of these ferments is necessary for securing satisfactory results in immunity.



## RESULTS OF EXPERIMENTS WITH SERUM AS A CURATIVE AGENT.

During the years 1893, 1894, and 1895 it was possible to make some more experiments with the serum as a curative agent for hog cholera and swine plague upon a somewhat larger scale. These experiments were reported to the Society for the Promotion of Agricultural Science in Buffalo, N. Y., in August, 1896, and published in their proceedings, in the New York Medical Journal, September 5, 1896, and in Centralbl. f. bakt. u. Parasit., Vol. XX, No. 16-17, 1896.

The animals used for the production of the serum were treated for me by Dr. Schroeder, in charge of the experiment station of the Bureau.

After several months' injection of the cows with the virulent hog cholera culture, the serum was tested. The following is a record of one of the experiments:

*Guinea pigs injected with serum from treated cows.*

March 9, 1894, No. 219, weight 17 ozs., received 1.5 c. c. of serum.  
 March 9, 1894, No. 220, weight 12 ozs., received 1.5 c. c. of serum.  
 March 9, 1894, No. 221, weight 11 ozs., received 1.5 c. c. of serum.  
 March 9, 1894, No. 222, weight 17 ozs., received 1.5 c. c. of serum.

March 18, 1894, No. 219, weight 18 ozs., received 3 c. c. of serum.  
 March 18, 1894, No. 220, weight 11 ozs., received 3 c. c. of serum.  
 March 18, 1894, No. 222, weight 19 ozs., received 3 c. c. of serum.  
 March 18, 1894, No. 223, weight 14 ozs., received 3 c. c. of serum.

No. 221 was found dead from pneumonia on March 16.

On March 20 No. 220 was found dead from pneumonia.

March 23, 1894, No. 219, weight 17 ozs., received 1.5 c. c. of serum.  
 March 23, 1894, No. 222, weight 17 ozs., received 3 c. c. of serum.  
 March 23, 1894, No. 242, weight 10½ ozs., received 3 c. c. of serum.  
 March 23, 1894, No. 243, weight 10½ ozs., received 3 c. c. of serum.  
 March 23, 1894, No. 246, weight 9½ ozs., received 3 c. c. of serum.

March 28, 1894, No. 219, weight 18 ozs., received 4.5 c. c. of serum.  
 March 28, 1894, No. 222, weight 18 ozs., received 6 c. c. of serum.  
 March 28, 1894, No. 223, weight 13 ozs., received 4 c. c. of serum.  
 March 28, 1894, No. 242, weight 12 ozs., received 3 c. c. of serum.  
 March 28, 1894, No. 243, weight 12 ozs., received 3 c. c. of serum.  
 March 28, 1894, No. 246, weight 11 ozs., received 3 c. c. of serum.

On April 9 the following guinea-pigs were inoculated with one-tenth cubic centimeter of peptonized beef-broth hog cholera culture each:

No. 219, weight 23 ozs.	No. 261, weight 12 ozs.
No. 222, weight 18 ozs.	No. 262, weight 15 ozs.
No. 223, weight 12 ozs.	No. 263, weight 20 ozs.
No. 242, weight 13 ozs.	No. 264, weight 14 ozs.
No. 243, weight 13 ozs.	No. 241, weight 15 ozs. (check).
No. 246, weight 12 ozs.	No. 260, weight 12 ozs. (check).

Nos. 261, 262, 263, and 264 had not received previous injections with serum; 241 and 260 were checks; while the other animals had been treated with serum, as above noted.

April 11, No. 261 received 3 c. c. of serum.

April 11, No. 262 received 3 c. c. of serum.

April 11, No. 263 received 5 c. c. of serum.

April 11, No. 264 received 4.5 c. c. of serum.

April 14, No. 261 received 3 c. c. of serum.

April 14, No. 262 received 3 c. c. of serum.

April 14, No. 263 received 4.5 c. c. of serum.

The results: April 17, No. 260 (check) was found dead from hog cholera; April 19, No. 222 was found dead from hog cholera; April 20, No. 264 was found dead from hog cholera; April 25, No. 241 (check) was found dead from hog cholera; Nos. 219, 223, and 261 were also found dead from pneumonia. There had been quite an outbreak of pneumonia among the guinea-pigs just at this time, accounting for these lesions which were not due to cholera.

Of the entire number of pigs treated, therefore, the checks died in from 8 to 16 days. Three of the pigs that had previously been vaccinated with 6 c. c. of serum each recovered and two of the pigs that had received 6 and 8 c. c. of serum two days after the inoculation with the germ recovered from the disease. These experiments repeated later showed that while the blood contained a curative and protective substance the quantity present at the time would not cure disease by the injection of several small doses. Subsequently, by continued treatment of the animals, the curative material was increased in quantity, as will be seen from experiments reported later.

Already in 1894 some work had been done which served to emphasize the close relationship between the products in artificial media of the growth of the hog cholera germ and those produced by the growth of the bacillus *Coli communis* (the ordinary intestinal bacillus). A pig which had been immunized to hog cholera by long-continued injections of the *Coli communis* and subsequently inoculated with the hog cholera germs was used as a source for the serum for treating guinea-pigs, as follows:

No. 425, weight 11 ozs., received 3 c. c. of serum.

No. 426, weight 9 ozs., received 4.5 c. c. of serum.

No. 422, weight 9 ozs., received 0.5 c. c. of serum.

No. 423, weight 11 ozs., received 1.5 c. c. of serum.

No. 424, weight 8 ozs., received 2 c. c. of serum.

Fifteen days afterward these pigs and two checks, Nos. 442 and 443, were inoculated with one-tenth cubic centimeter of a peptonized beef-broth hog cholera culture one day old. Seven and 10 days,

respectively, after this inoculation the checks were found dead from hog cholera while the other guinea-pigs remained well. These experiments repeated upon another set of animals gave about the same results, which showed that an immunizing substance is produced in the blood of a hog that is protected against the cholera. Another set of experiments, the details of which need not be reported here, showed that while the hog itself might be immune to disease, its blood serum may have lost the power of conferring immunity upon other animals. This confirms the conclusion with reference to the use of blood serum in other diseases, namely, that the immunizing principle in the blood serum can best be obtained if the animals are inoculated from time to time with the culture, or toxins. So long as the animal receives continued injection of the cell contents or products of the germ the immunity of that particular animal continues, and in addition the antitoxic substance is found in the blood. After some time the antitoxic substance may no longer be noted in the blood, or only in small amounts, while the immunity of the individual animal from which this blood is obtained may still continue. The antitoxic substances are apparently the products of cell activity only.

These experiments with the serum of immune hogs and the serum of cattle and horses that had been made artificially immune warranted further investigation.

In practice, however, it is found that hogs are exposed not only to the disease of hog cholera but also to another disease called swine plague, both of which may occur together in the same animal, or there may be an outbreak of one or the other disease alone. As the experiments made in 1891 with the products of the swine plague germ as obtained from artificial media had shown that these could be used as immunizing agents it was very reasonable to suppose, when the nature of the disease swine plague is considered, that an antitoxic<sup>1</sup> serum for this disease might also be obtained. A cow was used as the source of the serum after she had been repeatedly inoculated with cultures of the swine plague germ. The preliminary tests of this serum were made upon rabbits. One-tenth cubic centimeter of a peptonized beef-broth culture of the swine plague sufficient to kill a rabbit in fifteen to eighteen hours was used. Several sets of experiments showed that while the check rabbits were killed within the specified time by the swine plague cultures, others could be kept alive from six to ten days longer than the checks by the injection of 9 c. c. of the serum per pound weight. As these results indicated that antitoxic, or curative, substances were present in the serum, its

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<sup>1</sup> The word antitoxic is used in this article in the sense of curative.

effect was tried upon guinea-pigs. One-tenth cubic centimeter of swine plague culture was used, sufficient to kill the animals. The experiments gave the following:

No. 348 (check), weight 12 ozs., received 0.1 c. c. swine plague culture.

No. 349, weight 8 ozs., received 0.1 c. c. swine plague culture and 3 c. c. serum.

No. 350 (check), weight 11 ozs., received 0.1 c. c. swine plague culture.

No. 351, weight 9 ozs., received 0.1 c. c. swine plague culture and 6 c. c. serum.

No. 352, weight 8 ozs., received 0.1 c. c. swine plague culture and 6 c. c. serum.

While the check animal died the pigs which received the antitoxic serum recovered, about 6 c. c. per pound weight being required to check the disease.

With the assistance of Dr. Dorset I next endeavored to isolate the antitoxic principle contained in the serum, according to a method prescribed by Brieger and Boer<sup>1</sup> for the isolation of diphtheria antitoxin, by the use of zinc sulphate, repeated solution in sodium hydrate and precipitation with CO<sub>2</sub>. In this way from 90 c. c. of serum about 0.152 gram of a practically ash-free white powder was obtained. The antitoxic properties of this substance when tested proved to be about the same as those of the serum. As we had therefore a serum which exhibited antitoxic, or curative, properties for hog cholera, and another which exhibited antitoxic, or curative, properties for swine plague, it was of interest to see if these serums would be of use interchangeably. The result showed, however, that the hog cholera serum protected guinea-pigs from the cholera germ but not from the swine plague germ, and that the swine plague serum protected or cured guinea-pigs from infection with the swine plague germ but not from the hog cholera germ. This demonstrated again the independent character of these two diseases, attention to which has often been drawn in previously published work.

As the preliminary experiments so far reported had shown that specific antitoxic serums for hog cholera and swine plague could be obtained, the work was carried forward on a somewhat larger scale, and serums secured which were effective in much smaller doses upon experimental animals. The laboratory results seemed to warrant a trial of this method in the field, and experiments were made during the summer and fall of 1897 on this line in Page County, Iowa.

#### THE PREPARATION OF THE SERUM.

In preparing the serum for this work we have used cattle, horses, mules, donkeys, etc.; the animals received injections of the filtered, sterile, or live cultures of the hog cholera germ and swine plague germ, respectively, or the solutions of their products, including cell contents, extracts, and secretions. These injections were made

<sup>1</sup>Zeit. für Hyg. u. Infectiouskrank., Bd. XXI, Pt. 2.



either subcutaneously, intravenously, or intra-abdominally, or a combination of two or more of these methods, depending upon the results obtained. The quantities given at first were small, but increased gradually until large amounts of the material used could be injected without bad results. This treatment of the animals must be carried out very carefully and requires six to eight months' time before the serum is sufficiently potent to be of any practical use. As the treatment continues the power of the serum to check the motility of the hog cholera germ increases with rapidity. The serum of animals treated with swine plague cultures also sometimes checks the motility of the hog cholera germ. The value of the serum was determined by the amount of serum necessary to protect or cure guinea-pigs from an inoculation with the hog cholera germ or swine plague germ sufficiently virulent to kill the check animals in the usual time—a week to ten days.

The details of the method of treating these animals for preparing the serum, which were the results of numerous conferences between Dr. Schroeder, in charge of the experiment station, and the writer, will be given in another publication. Too much care can not be observed in selecting the animals and in observing proper precautions during the injections with the different products of the cultures that are used for producing in the animals a curative serum. The testing of the serum, as already noted, was usually made by treating animals that had been previously inoculated with a fatal dose of the culture. This method of testing is sometimes not altogether satisfactory so far as the cholera germ is concerned, although the results given with the swine plague are quite satisfactory. We have therefore used another method, namely, the injection of a quantity of the products of the hog cholera germ sufficient in quantity to kill the check guinea-pigs, while the other guinea-pigs so injected and treated with the serum will not succumb. This method promises more satisfactory results, and a better basis can thus be secured for estimating the amount of curative serum which should be used for injecting large animals.

In order to keep and utilize large quantities of serum, we have found it very convenient to concentrate it, and by making use of well-known principles we have accomplished this by freezing, so that a more concentrated material can be obtained and a less quantity of serum used for injecting animals. The preparation of a solid serum or an extract from the serum of the active products, secured by means of precipitation, has already been referred to, but for practical purposes it would appear that a concentrated serum is the best product to place in the hands of the individual veterinarian. If our experiments, continued on a still larger scale, give as satisfactory results as those obtained during the years 1897 and 1898 (and there is every reason to hope that such will be the case) it would appear

that we have at hand a practical method which may be used for decreasing very materially one of the most serious losses to which the farmer is subjected.

#### THE PREPARATION OF A MIXED SERUM FOR THE TREATMENT OF HOG CHOLERA AND SWINE PLAGUE.

The experiments had shown that the serum prepared for the purpose of curing hog cholera was useful in protecting or curing small experimental animals from hog cholera only, and that serum prepared for the purposes of curing swine plague was useful in protecting from swine plague only. Other work had shown that if experimental animals infected with hog cholera were treated with a mixture of anti-hog cholera and anti-swine plague serum, that they responded generally a little bit more quickly to the treatment. Efforts were made therefore to prepare in one and the same animal a double serum, as it may be called. In order to do this, the animals which were to serve as a source for the serum were injected with hog cholera cultures and swine plague cultures, or their products, alternately or together, the doses being gradually increased until enough had been injected to impart to the serum the desired properties. The first tests upon experimental animals showed that a serum could be obtained in this way which exerted slight curative properties for both hog cholera and swine plague. The serum, however, was more active in checking swine plague than in checking hog cholera. The treated animals did not thrive under this treatment. The work, however, indicated the possibility of perhaps producing in the same animal a serum which may be specific for two distinct diseases. Experiments are being made now to ascertain to what extent this principle can be utilized in connection with other diseases of men and animals, especially tuberculosis.

#### CHARACTER OF IMMUNITY.

The length of immunity produced by the injection of serum is short and more permanent immunity can apparently be secured by using in addition to serum the products of the germs. The serum has appeared most efficacious in treating herds where the disease had just begun.

#### DIFFICULTIES IN FIELD WORK.

A very important difficulty which is encountered in field work is that it is almost impossible to determine in the field whether animals are suffering from hog cholera or swine plague, or from a mixed infection, unless a careful autopsy has been made. And even when this is done, on account of the similarity of many of the lesions found

in the two diseases, it is necessary to resort to a careful bacteriological examination of the cultures obtained from these animals in order to decide whether the disease dealt with is hog cholera or swine plague. This has already been pointed out in previous publications of this Bureau. On account of this practical difficulty the idea very naturally suggested itself that it would be well to treat animals in the field with a curative serum for hog cholera mixed with a curative serum for swine plague obtained from different animals or with a mixed serum produced in the same animal, as has already been noted. The quantity of the serum used for treating pigs weighing from 40 to 60 pounds was 10 c. c. When they were heavier a larger quantity was used. In general, in the experimental as well as the practical work that has been done by the Bureau, a single injection of the serum was all that was given to each animal. Unless the serum to be used for this work is of such strength that one-half to 1 c. c. of it will protect a 500-gram guinea-pig from a fatal inoculation with hog cholera or swine plague it is not suitable for practical work.

#### WORK IN PAGE COUNTY, IOWA, IN 1897.

The Secretary of Agriculture requested the Governor of Iowa to designate a county of the State of Iowa in which he would like to have experimental work carried on by the Bureau of Animal Industry. The Governor selected Page County. The serum for treatment was prepared according to the methods that have been previously noted, conjointly under the direction of Dr. Schroeder, in charge of the experiment station of the Bureau of Animal Industry, at Washington, and the writer, in charge of the Biochemic Laboratory. The field work in Page County was in direct charge of Dr. Marion Dorset. The methods of treatment used were the following: Sick animals were inoculated with serum that had been found in the laboratory to be effective against either hog cholera or swine plague, or the swine were inoculated with mixed serums, or they were inoculated with the serums to which had been added the products of the hog cholera and swine plague bacteria and their cell contents, or cultures in which the germs had been killed without the application of heat, that might in any way have affected the secretions of the germ.

In order properly to note the efficiency of field work of this sort it is very important that a large number of checks should be preserved. To accomplish this in some instances a portion of the treated herd was reserved and not given serum. In other instances herds in which disease existed of about the same virulence as that in the treated herd were left as checks.

The conditions under which animals are placed in all diseases of course influence very greatly the results of the methods of treatment used. A child sick with diphtheria may be given an injection of

antitoxic serum, but if after this injections the child is otherwise neglected it will in all probability not recover, as while the antitoxin counteracts the specific poisons of the diphtheria germ it does not give the further stimulation to the system which is also necessary for recovery. The case is similar in the diseases of animals. They should also be given proper care as to food, water, proper housing, and a modern degree of cleanliness if any method of treatment whatsoever is to prove satisfactory. Very often the farmer has himself to blame quite as much as an outbreak of some particular disease for the loss which takes place in his herd. If he treats his animals as inanimate he must not be surprised if they finally become inanimate, nor can he hope that when they are almost dead the administration of some remedy will miraculously serve to revive them. In many instances where the animals used in this work were treated the farms were in a very good condition and the owner exhibited a sufficient amount of interest, care, and intelligence to warrant successful results. In other cases the farms were very poor and the farmers seemed indifferent as to whether their hogs had anything to eat or drink for two or three days. In order therefore to give the fairest test possible to the method of serum treatment, the better farms were the ones reserved for checks.

#### FIELD WORK IN 1897.

To give the general results with the work carried out under the direction of Dr. Dorset, it may be stated that out of 196 animals treated with the mixed serums 161 were saved, or about 82 per cent. The disease existed on all of the farms where treatment was carried out, a number of animals had already died, and about 50 per cent of the animals treated were ill at the time of injection with the serum. In the check herds there were originally 429 animals, and the disease had begun both in these check herds and in the treated herds about the same time. In the herds, which were not treated, only about 15 per cent of the animals recovered. Comparing these two sets it would appear that the serum had reduced the mortality about 67 per cent. It is understood, of course, that all of the animals were under the same conditions after treatment as before. As a rule, the animals appeared to begin to improve very shortly after the injection of the serum. One herd was treated with a culture alone without any serum. Only 40 per cent of the herd so treated was saved. In another case a herd which was in a very poor condition at the time of inoculation was treated with a mixed swine plague serum and a dead culture. Eighty per cent of these animals were saved, while in a third similar case where the condition of the animals was very poor, only 30 per cent was saved. These results, obtained under rather adverse conditions, indicated that



serum injection for swine diseases could be practiced with a fair degree of success when the animals are intelligently treated with a mixed hog cholera serum and swine plague serum and bacterial products, provided these serums are active. The material used in this way is perfectly harmless, so that a farmer need have no fear whatsoever in allowing his animals to be injected; if it should happen not to effect the desired cure it will not injure the animal in the slightest degree. In general, of course, the sooner the treatment of sick animals can be begun the better will be the results of the treatment, but unless the reliability of the serum has been carefully tested and established experimentally, it does not necessarily follow that a sick animal which has been injected with a serum that is said to be efficacious will be cured. If in the case of diphtheria the mortality has been reduced 50 per cent by the serum treatment after long years of careful trial with thousands of cases, it is fair to assume that this method of treatment of swine disease is worthy of a more extensive practical experiment.

The character of the disease in the animals treated, as well as in the check herds in the year 1897, was determined by careful autopsy or, so far as possible, by the identification of the cultures made from the diseased organs of some of the animals upon which autopsy had been performed. In most of the cases examined the hog cholera germ was found present, and specimens of blood which were examined for me by Dr. Dawson, assistant in the Division of Animal Pathology of this Department, gave the characteristic reaction. The checking of the motility of the hog cholera bacilli, a reaction similar to that used for diagnosing typhoid fever, as has been suggested, might perhaps be useful in determining the character of diseases among swine in the field in a quicker way than would be possible if it was necessary always to work out the nature of the culture. While the majority of these blood examinations agreed with the culture tests, in a few instances the characteristic checking of the motility was observed in blood taken from animals which undoubtedly died from swine plague. These animals may have had in addition, however, a slight infection with hog cholera. At any rate, in chronic cases of disease in swine, when it is sometimes difficult to succeed in transferring to the laboratory a virulent culture from the diseased animals, it is probable that the blood test may be of service as a diagnostic agent.

So long as a serum is being used which has curative properties for both of the diseases to which the animals in the field are usually subjected, it is not of so much importance to be able to make a positive diagnosis or distinction between the two diseases. The acuteness of the attack is perhaps of more importance, as it serves to indicate the amount of serum which should be used in treating animals.

## FIELD WORK IN 1898.

As the laboratory experiments and the field work of 1897 already reported had given such encouraging results, at the request of The Hon. James Wilson, Secretary of Agriculture, Congress made a larger appropriation which should be utilized during the year 1898 for making more thorough practical tests of this curative serum for swine. Unfortunately this appropriation was not made available as early as desirable. It was necessary after the needed funds were secured to erect additional stables to accommodate the large number of animals at the experiment station of the Bureau, to purchase the animals and other necessary facilities for carrying on the the work. The experimental work in preparing the serum therefore could not be begun before the first of June, and consequently the amount of serum ready for use in the fall of 1898 was not so large as we had hoped, or as it might have been if the appropriation had been available three or four months earlier, when it was requested. Nevertheless, the field work was resumed again in Page County, Iowa. In July, Dr. McBirney, an inspector on the Bureau force, was put in charge of the work in that county, after being given instructions from the laboratory as to the quantity of serum to be used, the method of using it, the manner of treating herds, the method of keeping records, and so on. This work was carried out very faithfully by Dr. McBirney, according to the general directions furnished him, and the results reported up to date (December 1, 1898) have been exceedingly satisfactory and tend to confirm the results obtained in the year 1897. Between the 13th of July and the 11th of November, Dr. McBirney treated 35 herds containing 1,727 animals. Of these treated animals 403 died—a loss of 23.16 per cent in the treated herds. Cultures and specimens of blood were sent to the laboratory from most of these herds, and in 17 of the herds the presence of the hog cholera germ was demonstrated by tests upon experimental animals as well as by a careful study of the cultures. In 3 the presence of the swine plague germ was demonstrated. The examination of the blood and the motility test confirmed the presence of either hog cholera or swine plague, and indicated its presence in some of the herds the cultures from which had not given positive results. Autopsies were made upon one or more animals in each of these herds and records carefully kept. They indicated in many instances the presence of acute or chronic hog cholera, in a few cases swine plague, or a combination of both diseases.

Thirty-three herds in whole or in part were reserved as checks upon those which were treated. In some of these herds the character of the disease was also demonstrated by cultures or blood reactions. In others the autopsy indicated the character of the disease and hog cholera was found predominant. The number of animals in

these check herds was 3,197. Of these only 600 survived, or 81.24 per cent was lost. This shows about as large a percentage of animals saved in the treated herds as were lost in the nontreated herds and leaves apparently but little doubt as to the efficacy of practical treatment of swine diseases in the field by the use of these mixed serums alone or with bacterial products, combined with simple methods of disinfection and slight care which every farmer should be willing to give to his animals. The serum is intended to cure disease simply, and should have such aids as clean, warm quarters and good food and water; it is no protection against freezing, smothering, or starvation.

The results of our work so far warrant the following conclusions: Animals treated with the hog cholera germs, their cell contents and secretions, or those of allied germs, yield a serum which has curative properties for hog cholera. Similar results are obtained for swine plague by the treatment of animals with the germs or their cell contents and secretions.

The most satisfactory results in field work have been secured by treating the swine with a curative serum for swine plague mixed with a curative serum for hog cholera.

#### LOSSES FROM HOG CHOLERA AND SWINE PLAGUE.

It is estimated that the State of Iowa alone loses \$15,000,000 per year in the number of hogs that die from disease. The work, which has been carried on as above reported, indicates that at least \$11,000,000 of this loss might be avoided at a comparatively slight cost.

#### EXPENSE OF THE METHOD OF PREPARING AND USING SERUM.

The farmer should be able to have his hogs injected at a cost not to exceed 15 cents per head if the material for this purpose is prepared in a careful and legitimate way—for the benefit of the farmer rather than for the benefit of the manufacturer. If the latter simply desires to reap financial profits, irrespective of the fact that his material may or may not be useful, the results will undoubtedly be disastrous. Fifteen cents per head is but a trifle to the farmer if he is thereby enabled to save 60 to 80 per cent of his animals which would otherwise be lost.

#### SOURCES OF INFECTION AND NECESSITY OF DISINFECTION.

The fact that the cause of infection can be carried from one farm to another by animals, by birds, by water running through several farms on some of which disease exists, by the farmers themselves visiting the pens and lots where their neighbors have sick hogs, can not be too strongly emphasized. Disinfection of the premises, of the farmer's boots, clothing, of the wagons, etc., are absolutely necessary. Hence in all cases pens and lots should be thoroughly disin-

fectured with lime or 5 per cent carbolic acid, a pure water supply should be secured, and the hogs should from time to time have access to a mixture of salt, sulphur, and charcoal, or this should be put in their food. The animals should also have access to comfortable, well-protected sheds.

#### STATE SUPERVISION.

The results of the experiments conducted by the Bureau of Animal Industry indicate the advisability of certain State experiment stations carrying out this line of work in cooperation with the Bureau of Animal Industry.

Some expense is necessary for starting plants, building stables, and securing the animals, and a good deal of instruction for the men who undertake the work would be required. At the same time, as these experiment stations were inaugurated in order to advance the agricultural interests of the farmers, as they receive a very large amount of support from the National and State governments, it is presumed that they will gladly cooperate in every effort to promote the interests of the farmer. Undoubtedly commercial firms would be only too anxious to take up the manufacture of these serums, as the loss to farmers from these diseases of swine is so enormous. The moment that products of this sort, which can be so easily put up in a condition that they may be perfectly worthless and still appear satisfactory, are placed on the market for gain, the temptation is so great to sell an inefficient material that very often unsatisfactory results may be obtained and great discredit thrown upon the entire work. If private firms undertake the manufacture and sale of serum for treating swine, their products and prices should be subject to legal supervision. If the public is protected against the sale of utterly worthless fertilizers, as is the case in many of our States, most assuredly the sale of a material which may prove so essential to the farmer should also be subject to legislative control. No lot of serum should be sold unless it had been approved, and its value as a curative agent tested, by careful official inspection and trial. As the Bureau of Animal Industry has now a plant for the manufacture of this material, has obtained a great deal of very valuable experience, and has worked out the theoretical and some of the practical principles of the use of serum which promises such good results in treating swine, it is probable that for several years to come at least those who are working along these lines will prefer that the control of this material should remain either directly in its hands or under its supervision. The Bureau is endeavoring to push the work, and to supply larger and still larger quantities of serum for use, and will carefully note and report the results.



U. S. DEPARTMENT OF AGRICULTURE.  
BUREAU OF ANIMAL INDUSTRY.

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NOTES UPON DAIRYING IN CALIFORNIA

AND

THE EXPORT OF CALIFORNIA BUTTER  
TO THE ORIENT.

BY

R. A. PEARSON, M. S.,  
ASSISTANT CHIEF OF DAIRY DIVISION.

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Prepared under the direction of  
Dr. D. E. SALMON,  
Chief of the Bureau of Animal Industry.



WASHINGTON:  
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1900.



## LETTER OF TRANSMITTAL.

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U. S. DEPARTMENT OF AGRICULTURE,  
BUREAU OF ANIMAL INDUSTRY,  
*Washington, D. C., October 31, 1899.*

SIR: I have the honor to transmit herewith a manuscript entitled "Notes upon dairying in California and the export of California butter to the Orient," prepared by Mr. R. A. Pearson, assistant chief of the Dairy Division.

Mr. Pearson recently visited California under your orders, and this report of his visit is prepared in accordance with your direction. The California State Fair and the annual convention of the State Dairymen's Association were attended with a view to meeting representative men and inquiring as to the present condition of the dairy industry in that State and the possibilities of supplying dairy products suitable for export from the Pacific coast.

This paper contains numerous suggestions which may be of special interest to California dairymen at this time, and I recommend its publication as a bulletin.

Respectfully,

D. E. SALMON,  
*Chief of Bureau.*

Hon. JAMES WILSON, *Secretary.*





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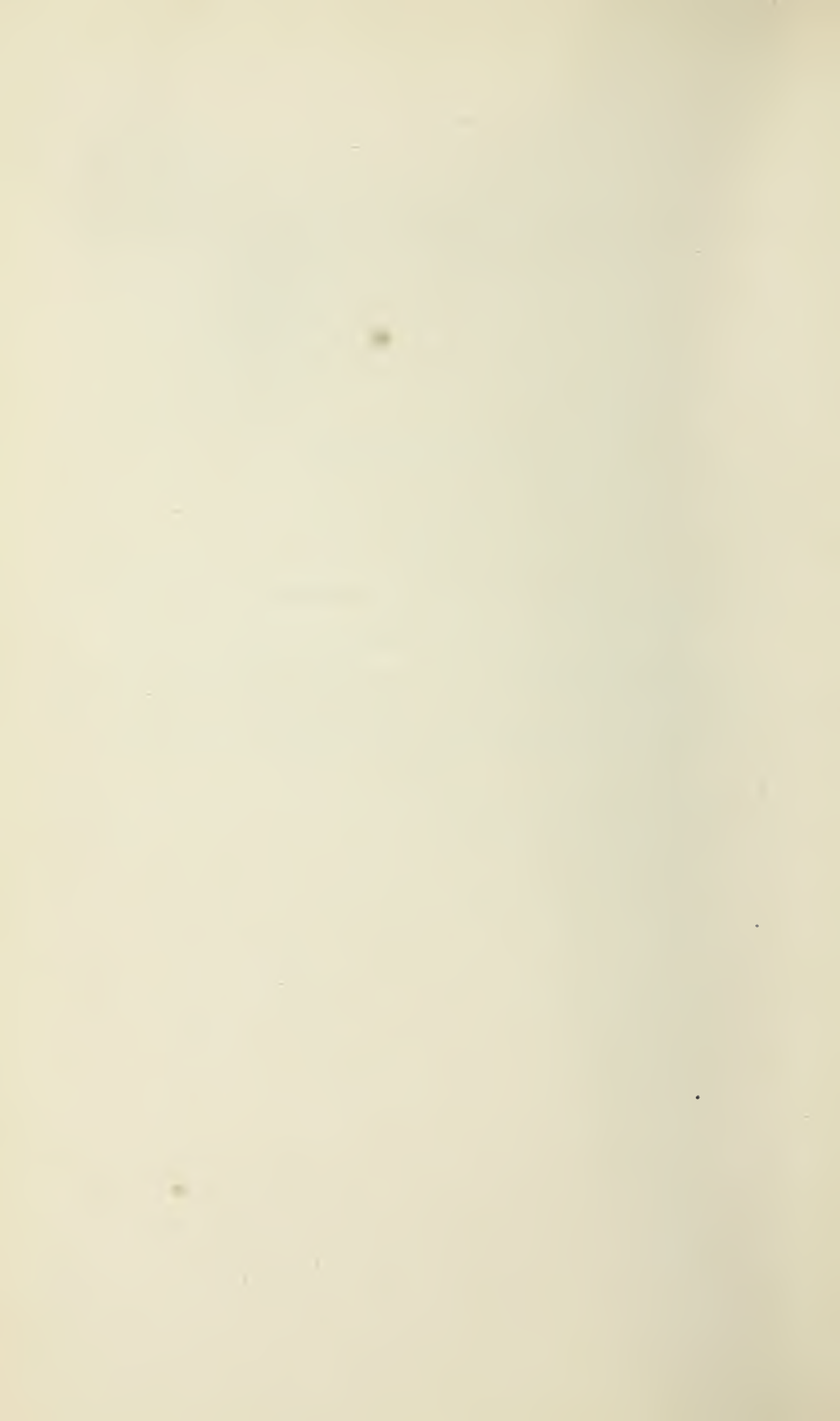
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## NOTES UPON DAIRYING IN CALIFORNIA AND THE EXPORT OF CALIFORNIA BUTTER TO THE ORIENT.

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### THE STATE FAIR.

The California State fair at Sacramento, September 4 to 16, 1899, was said to be the most successful ever held by the State board of agriculture. The number of exhibits was larger than in previous years and the number of visitors had never been equaled. Although the dairy features of the fair were overshadowed by the exhibits of fruits and vegetables, which were shown in great number and variety, and by the usual displays of agricultural products and implements, a very creditable showing was made of dairy stock, implements, and products.

### DAIRY LIVE STOCK.

In the live-stock department were representatives of the leading milk breeds of the State—Jerseys, Holsteins, and Shorthorns—and not a few of the animals showed high merit, capable of taking prizes in many Eastern fairs. The exhibit demonstrated that at least some of the breeders of the State are well to the front in their work. There were fewer animals shown than would have been expected from so large a State. One reason for this was the small number of registered herds in California as compared with other dairy States, and another was the lack of sufficient interest on the part of owners of well-bred stock. There are numerous herds of blooded dairy cattle throughout the State; but it appears that the benefits of showing at the fair are not considered equal to the drawbacks, one of the greatest of which is the long and expensive haul to and from the fair. Without strong inducement, a breeder of fine cattle will not subject his animals to the excitement of travel and noisy crowds.

### DAIRY MACHINERY.

The displays of creamery and dairy machinery and utensils were quite similar to what would be seen at a large Eastern fair; in fact, much of this apparatus is furnished to California supply houses from Eastern factories. On an elevated platform the operations of a working creamery were carried on daily. This instructive feature is commendable and worthy of imitation. The time and place of such an

exhibition should be thoroughly advertised, so that all who might want to see it would know about it.

# BUTTER.

About thirty samples of butter—in squares, rolls, tubs, and small export packages—were entered for prizes. It was in three classes—fresh, June storage, and packed for export. Six prizes—\$30, \$25, \$20, \$15, \$10, and \$5—were offered in each of the first two classes, and three prizes—\$25, \$20, and \$15—were offered for export butter. Although these prizes did not attract an exceptionally large number of entries, the competing samples were representative of all sections of the State and they were uniformly of high quality. The butter was judged by Mr. W. D. McArthur, of San Francisco, a temporary special agent of this division, and the writer. The following table gives the names of exhibitors, their addresses, and scores. In order to show the districts where the exhibited samples were produced, the State is divided into five parts of about equal size, by imaginary east-and-west lines; these are designated from north to south by the letters A, B, C, D, and E, respectively, and the letters are shown in the first column of the table:

*Scores on butter at the California State fair, September 13, 1899.*

Exhibitors.	Section.	Flavor (50).	Grain (25).	Color (10).	Salt (10).	Appearance (5).	Total (100).
FRESH.							
Alton Creamery Co., Alton.....	A	47½	23½	10	10	5	96½
Eel River Creamery Co., Ferndale.....	A	47½	23½	10	10	5	96½
Geo. E. Peoples, Bakersfield.....	D	47½	23½	10	10	5	96
O. J. Vine, Lakeport.....	B	47½	23	10	10	5	95½
G. G. Knox, Grafton.....	B	47½	23	9½	10	5	95½
Allen Quain, Stockton.....	C	47½	23	10	10	5	95½
Joseph Sheppard, Point Arena.....	B	47½	22½	10	10	5	95
O. E. Jones, Newman.....	C	47½	22½	10	10	5	95
Lockeford Creamery Co., Lockeford.....	C	47	22½	10	10	5	94½
J. N. Keiser, Hollister.....	C	46½	22½	9½	10	5	93½
J. A. Howie, Compton.....	E	46	22½	10	10	5	93½
Warren Myers, Woodland.....	B	45	23	10	10	5	93
C. A. Starkweather, Oakdale.....	C	46½	22	10	9½	5	93½
W. T. Mitchell, Susanville.....	A	46½	22½	9	10	5	93½
Geo. E. Newman, Lompoc.....	E	45	22½	10	9½	5	92½
JUNE STORAGE.							
W. M. Twiner, Sierra Valley.....	B	45	23	10	10	5	93
E. H. Zimmerman, Watsonville.....	C	44½	22½	10	10	5	92½
J. H. Keiser, Hollister.....	C	44	23	10	10	5	92
D. Brough, Newman.....	C	44	22½	9½	10	5	91½
A. J. Bloom, Petaluma.....	B	44	22	10	10	5	91
Bailey Bros., Crescent City.....	A	43	22½	10	10	5	90½
W. T. Mitchell, Susanville.....	A	42½	22½	10	10	5	90
O. J. Vine, Lakeport.....	B	42	23	10	10	5	90
O. E. Jones, Newman.....	C	42½	22½	9½	10	5	89½
C. A. Starkweather, Oakdale.....	C	42	23	10	10	4½	89½

*Butter in small cans for export.*

[Cans scored equally; judged on quality of butter.]

Dairymen's Union of California, San Francisco, first premium for butter in paraffined paper can; Hilmer, Bredhof & Schulz, San Francisco, second premium for butter in lithographed tin can; Sussman, Wormser & Co., San Francisco, third premium for butter in lithographed tin can.

Both first and second prizes on fresh-made butter went to creameries in Humboldt County, a large county near the northern boundary of the State, bordering on the ocean, and possessing exceptional advantages for dairying. Some well-informed dairymen claim that this county is the best natural dairy district in the world. The third prize on fresh-made butter was taken by a creamery in the southern part of the State. The fourth and fifth prizes went to the district just north of an east-and-west line through San Francisco, and the sixth prize to the district just south of the same line. All of the entries of storage butter were from the central and northern parts of the State.

It happened that the Humboldt County creameries had a distinct advantage over most of the others in the State at the time the fresh butter was made for the fair, as many factories elsewhere were then receiving milk from patrons whose pastures were suffering on account of the dry season, and undesirable flavors could not be avoided, while the pastures in Humboldt were in good condition. The aroma and flavor of the Humboldt County butter were excellent. It was also exceptionally well made and well packed, as was shown by the fact that it stood the three days' journey by boat and rail from the creameries to Sacramento without unusual protection. It was in the regular California squares, described on page 25. Other entries were in small tubs.

Butter in hermetically sealed pound packages for export was exhibited in small quantity. The judges deemed it best not to attempt to decide the merits of the different packages, as the experimental shipments of butter from the Pacific coast to trans-Pacific ports, now being made by the United States Department of Agriculture, are partly for the purpose of testing the several packages available for shipments without refrigeration to tropical points. Therefore in this class prizes were awarded on the basis of the quality of the butter in the cans; and in this respect there was considerable variation, some of the samples being decidedly rancid. These small cans had been exposed for several days to high temperatures. Possibly they were thus put through more unfavorable conditions than would be encountered on a voyage to the Tropics, but this was probably not the case. They again showed that hermetically sealed cans will not, under all circumstances, preserve the good qualities of butter, as some people seem to think they are capable of doing.

#### THE DAIRYMEN'S ASSOCIATION.

The sixth annual meeting of the California State Dairymen's Association was held during the State fair at the capitol building. It was attended by leading dairymen, creamery men, and cheese factory men from all parts of the State. Representatives were present from commission houses in San Francisco and Sacramento. The State Univer-

sity was well represented, and the sessions were visited by prominent citizens. The press of the State gave liberally of its space in reporting the proceedings. A regular programme had not been prepared, as it was thought best to occupy the time with informal discussions on the special subject which the secretary had announced in advance, namely, "The export of dairy products from the Pacific coast." The topic was opportune, and its various phases were taken up and discussed in a logical way. A brief résumé of the facts brought out in the discussion follows.

#### THE INCREASE OF BUTTER PRODUCTION.

First, it was pointed out that dairying in the older States is being promoted and encouraged by various agencies, such as well-equipped dairy schools, live dairy associations, and efficient State dairy commissioners. And it is now being extensively developed as a new industry in certain large sections of the United States where only a few years ago cows were seldom seen. As examples of this recent dairy growth the activities in Georgia and the Dakotas were referred to. All this shows that our home markets will continually be more and more plentifully supplied, and in many cases competition will be keen.

It was stated that the production of dairy products in California is increasing and in some sections very rapidly. This is not surprising when one considers how the industry is favored by many natural conditions, of which too much could hardly be said. The mild climate, splendid natural grazing, and the tremendous crops of alfalfa which can be raised at small cost almost make it seem that California has been favored above all other States. Many of the great wheat ranches are gradually adopting dairying as a secondary interest, and some of them have gone into it farther than they had originally planned. Large herds of dairy cows (Pl. I, fig. 1) are becoming common, and the owners of less than one hundred cows refer to their "small herds" very much as an Eastern dairyman would speak of his fifteen or twenty cows. New creameries are in operation at many points. Besides the advantages named, the markets for dairy products have been good. It has been possible for the California dairyman to produce cheaply and sell well. It is therefore not unlikely that the growth of dairying will continue, and within a few years more butter and cheese will be made than the home market will require. California dairymen will then face conditions similar to those already met in the Eastern markets.

#### FOREIGN MARKETS FOR SURPLUS.

In the second place, the possibilities of finding markets for surplus in countries bordering on the Pacific Ocean were discussed. Although some of those lands fairly swarm with people, only small quantities of dairy products are sent to them, and these supplies are chiefly for the few foreigners who are there—Americans, English, Germans, and



French. As a rule the natives have not yet learned to use butter and cheese, but extracts from consular reports were read which showed that in some cases they are commencing to eat dairy products and a gradual increase in their demands may be expected. With improvement of domestic and commercial conditions, new tastes are developed and new wants are manifested. This is shown in the upward growth of every nation. Just at this time the changes which are taking place in some Asiatic countries are attracting the attention of the world. Every commercial nation is looking for new trade in articles not before called for, and in this respect California merchants propose to take an important place. American flour is a product which has successfully established a market for itself within the past few years. Large quantities are now shipped to places where it was once prophesied flour would never be commonly used. Other illustrations could be given of American products which have found favor. Judging by the success along other lines and by the small beginning already made by our butter and cheese, the Western dairymen have good reason to feel encouraged in their hopes of finding large markets across the Pacific. And it may be profitable to have such an abundant surplus that regular and frequent shipments can be made, at least during the season of greatest production, at which time there will be but little competition from dairy countries south of the equator.

Furthermore, attention was called to the fact that most of the small amount of butter going to the points referred to is now supplied by Denmark, France, and Australia, and, as a rule, the products from these countries are sold at prices in excess of what is paid for "States goods." In other words, the present limited demand for dairy products in the far East is being supplied chiefly by our competitors, and they frequently receive as high as 50 cents per pound for their butter. The California dairymen should, and many of them do, appreciate that the best way to assure themselves of enjoying a large share of the future trade with the Pacific countries is to secure and hold a large share of the present trade with those countries.

#### PREPARATION OF BUTTER FOR WARM CLIMATES.

It having been shown that there may soon be a surplus of dairy products available for export, that in the near future large markets for these products may be developed at trans-Pacific points, and especially that the United States does not share in the present trade to the extent that she should, the next question considered was how butter should be prepared for shipment to warm climates. There was an interesting discussion on the various phases of this question, participated in by dairymen, creamery men, and scientists, and numerous ideas of practical value were advanced. The want of refrigerated compartments for ocean transportation makes the problem quite different from what it is in the East.

As to the kind of butter wanted, all agreed that for export without refrigeration it should be of particularly hard body and high melting point. More stress was laid on this than on the necessity of its having a high flavor. A clean, mild flavor is wanted, and an article of close texture, with a dry, solid body and capable of resisting the effect of heat as much as may be. At the same time producers were warned not to make such butter except for foreign trade, as it would not sell as well as the regular creamery in home markets.

*Causes affecting hardness of butter.*—It is believed that the body, or hardness, of butter is largely within control of the feeder and butter maker. It is thought by some that butter made from milk containing large fat globules has a lower melting point than that made from milk containing small fat globules. According to this theory, butter from Channel Island stock would be softer than that from the so-called "cheese" breeds, a proposition that was opposed by not a few. It was stated, also, that butter made from milk taken during the latter part of the period of lactation is harder than that from milk taken soon after calving. That the body of butter can be easily affected by variations in manufacture is well known.

An important cause of difference in hardness is supposed to be difference in the relative proportions of the component parts of the butter fat caused by various kinds of feed. An increase in the stearin and palmitin, which are solids at ordinary temperatures, and a corresponding decrease in olein, which is an oil at ordinary temperatures, would cause butter to be harder, while changes of an opposite nature would make it softer. Practical experience and a few experiments show that the hardness of butter can be affected to a certain extent by the feeds given the cows. It was generally agreed that butter is made hard by the addition to the ration of a small amount of potatoes; cotton-seed meal has a similar effect, but too much of it will taint the butter. One person said oat hay and green corn fodder also have somewhat the same effect. On the other hand, linseed meal causes soft butter, and alfalfa hay when used alone does the same. An instance was given of a herd which had been fed on alfalfa and Bermuda grass and was changed to a pasture of young barley that had dried up before it was fully grown. The butter immediately became very hard. A commission merchant reported that the butter from one of his shippers suddenly became hard and would not melt as readily as usual. Upon investigation it was found that the herd had recently been turned onto a stubble field. Sugar beet pulp and tops were not discussed, but some facts about them are given below.

*Method of making.*—No special points were brought out regarding the manufacture of butter for the new trade. The ordinary methods are followed, but the necessity of using great care in every step of the work, so as to produce the highest grade article, was emphasized. The butter maker should discard all dirty milk. He can not afford to

introduce into the butter millions of bacteria of many species, which may cause bad flavors, when they can easily be excluded. It was recommended both to wash and to work the butter a little more than usual, to get out as much as possible of the casein, albumen, and sugar, which are excellent materials for bacteria to feed upon. Even when all possible precautions have been taken there will still be many bacteria in the finished product. Coloring and salting need not be different from the home requirements, unless to comply with special orders. It is the practice to do the canning in the butter cellars at San Francisco, using any butter sent to that market that appears to be satisfactory. The butter can be cut from large packages in lumps of proper size for the cans, so that reworking it is not necessary. Probably this method will obtain until a regular export trade is developed which will make it more economical to install canning appliances in the creameries.

The packages should be as nearly sterile as practicable at the time they are filled. They may be easily sterilized by exposure to steam in a tight chest of wood or galvanized iron. In packing, care should be taken to exclude the air as much as possible by having the butter completely fill the can. This is for the double purpose of keeping out bacteria which might be floating on dust particles in the air and to avoid furnishing one of the essentials for growth to those bacteria in the butter which can not develop without air. After the can is sealed some change takes place, unless it is held in cold storage, and this does not seem strange when it is remembered that, in spite of all the care which may be taken, some air will be in the cans and the butter is very likely to contain some bacteria which can thrive even in the absence of air. Thus it is seen that although hermetically sealed packages have many advantages they are not a panacea. The problem is not yet satisfactorily solved.

*Preservatives.*—There is a disposition on the part of some to use preservatives to hold bacteria in check, and various compounds of this class are on the market and are very strongly indorsed by those interested in their sale. Many misleading statements have been made in their favor. It has not been scientifically demonstrated whether preservatives in butter are harmful to consumers or not, but dairy scientists and leading dairymen strongly object to them on general grounds and the laws of some States forbid their use. It is interesting to note that Danish butter, which holds the first place wherever it is sold, is free from preservatives, and it is almost unnecessary to add that no preservatives are or have been used in butter sent abroad by the United States Department of Agriculture. It is to be hoped that the California dairymen will not adopt them until an unquestioned authority has plainly shown that their advantages exceed their disadvantages. Their general use at this time might cause great injury to the fair reputation the State is seeking for its dairy products. —A



resolution condemning their use was adopted by the Dairymen's Association.

It is argued that in some respects the process of digestion is similar to fermentation, and that any substance which stops the usual changes in a food product will also affect its digestibility. Furthermore, some and perhaps all of the active chemical substances in preservatives have distinct influence on the functions of certain organs of the body. No one cares to take a dose of medicine without need of it, much less regular and frequent doses of an unknown substance, even though they are small, and many persons would prefer to go without a certain food than to run such a risk. Still another objection to preservatives is the fact that they make it impossible for the butter maker to control the cream ripening and the development of desired flavors. As a matter of fact the effect of preservatives could be made unnecessary in most cases where they are used. A few milk producers and butter makers have unfortunately learned that these substances are, so far as appearances go, a fair substitute for cleanliness. By improving their methods they could do away with the use of the questionable compounds and enjoy a clear conscience in delivering to their customers goods known beyond a doubt to be pure. Preservatives do not wholly stop bacteria from growing and multiplying, and it is safe to say that by observing scrupulous cleanliness pure butter could be made which would keep as well as or better than the ordinary kind preserved. The pasteurization of milk for making butter for export is practicable, and it may be that this, in connection with cleanliness, will be the true solution of the problem.

*Packages.*—A round tin can holding 1 pound is the favorite package. Until quite recently all the joints of the can have been closed with solder, but now a special machine is used for fastening the top without solder, thus doing away with the necessity of applying heat to the can after it is filled. It is important to have the cans made of a good quality of standard tin (tin weighing about 100 pounds to the box has given satisfaction), and special care should be used to have them smoothly finished. The inside of the can is usually paraffined or lined with parchment paper; sometimes both paraffin and parchment paper are used.

The sale of butter always depends to a varying extent upon the appearance of the packages, and among the oriental people appearance has a decided influence. They like neatness and decoration, and therefore it pays to finish the cans in a way that will please them. Seals, trade-marks, fancy figures, and lettering are recommended. Paper labels soon become soiled, rubbed, and torn, and cans thus marked will be passed by for prettily lacquered ones. Some buyers attach more importance to the appearance of the packages than to the quality of their contents. There is no doubt that an official seal or stamp



showing inspection by an authorized person would often serve as a guaranty and aid in sales. Cans opened by removing with a "key" a narrow strip of tin from the side near the top have an advantage over the old-fashioned style and are much preferred in some markets.

#### SOME PURPOSES OF THE DEPARTMENT'S EXPORTS.

During the discussions on the general subject of exports an account of the efforts of the Department of Agriculture to find and develop new markets for our dairy products was given. A letter from Maj. H. E. Alvord, Chief of the Dairy Division of the Bureau of Animal Industry, Department of Agriculture, was read and received with applause. It told of the experiments already made in exporting high-grade butter to the English market, and explained the purpose of the Department to conduct similar experiments from the Pacific coast, by sending small lots of selected butter and cheese to a half dozen of the largest seaport cities of Japan and China, to show that the best grades of dairy products can be procured in this country, and to obtain information as to the best ways of shipment. It was pointed out that while a temporary overproduction of butter or cheese can be easily cared for and kept off the market by our excellent storage facilities, a continued production of goods of high grade in excess of the home demand would result seriously to the dairy interests by causing a fall of prices, unless a profitable outlet could be found for the surplus. This fact commends to all dairymen any efforts to extend markets for milk products. Whether they are personally interested in exporting or not, their welfare may largely depend upon the success of those who are engaged in foreign trade.

It is most important for our butter and cheese to bear a good reputation in all foreign markets, so that they will be received at their true value at any time they are offered for sale, and this thought was plainly brought out by several speakers. Such a desirable condition does not now exist, owing partly to the fact that a large proportion of the dairy products sent out from this country is inferior in quality. This is well known to be the case with shipments from New York; it is also true of shipments from San Francisco. Some of the Western merchants argue that, as the butter will be somewhat off flavor anyway when it reaches its destination, it will make little difference if it is just a bit inferior when it starts! This mistake is largely responsible for the fact that our butter in cans sells in many places at prices 25 to 50 per cent lower than the goods from other countries.

Much interest was shown in the efforts of this Department to improve present conditions and there were many liberal offers of assistance. Especially was this generous spirit shown by some creameries that were willing practically to place themselves at our disposal for the preparation of goods for export. The possible needs of the

Department were fully discussed with the officers of one well-equipped plant and they will hold themselves ready to fill any requirements on short notice.

#### THE PRESENT EXPORT TRADE.

A short time was spent in San Francisco arranging details in connection with our experimental exports. Although the three steamship lines to Hawaii, Japan, and China have more than they can do and are now refusing freight, their officials showed an interest in the work of the Department and agreed to assist in the experimental exports by carrying our consignments whenever offered. They do not have much call for service in refrigerated compartments and nothing of this kind is provided.<sup>1</sup>

By referring to the table below it will be seen that present shipments of dairy products would not justify transportation companies to go to very great expense for their exclusive accommodation. Nor is it now possible for this Department to guarantee to the steamship lines payment for freight on the full capacity of their refrigerators if not filled, as the Canadian government has practically done in some instances, to the great benefit of her dairy interests. The three principal trans-Pacific countries to which butter and cheese are sent from the United States are Japan, China, and Hongkong, and the amounts these countries and the Hawaiian Islands have received in recent years are shown in the following table. Of course, most of the shipments to these countries from the United States are from the Western ports.

*Exports of butter and cheese from the United States to Japan, China, Hongkong, and Hawaiian Islands, 1893-1899.*

[From Commerce and Navigation of the United States, Treasury Department.]

Year ended June 30—	Japan.		China.		Hongkong.		Hawaiian Islands.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
<b>BUTTER.</b>								
	<i>Pounds.</i>	<i>Dollars.</i>	<i>Pounds.</i>	<i>Dollars.</i>	<i>Pounds.</i>	<i>Dollars.</i>	<i>Pounds.</i>	<i>Dollars.</i>
1893 .....	56,664	11,402	5,789	1,303	7,491	1,793	114,355	23,253
1894 .....	58,189	11,534	5,768	1,312	5,000	1,048	72,578	15,992
1895 .....	77,001	14,007	5,528	1,097	1,165	245	122,555	23,068
1896 .....	101,751	18,103	20,277	3,709	3,536	708	128,847	23,243
1897 .....	87,180	15,654	25,336	4,621	3,850	725	127,037	22,808
1898 .....	115,203	23,097	21,555	4,688	13,315	2,779	152,367	34,561
1899 .....	92,495	18,592	22,337	5,159				
<b>CHEESE.</b>								
1893 .....	10,480	1,355	31,009	4,122	15,348	1,989	77,158	9,944
1894 .....	14,153	1,884	29,104	3,777	9,973	1,323	80,787	10,290
1895 .....	13,051	1,553	28,787	3,507	17,367	2,052	87,615	10,113
1896 .....	31,960	3,603	35,290	3,779	16,681	1,922	93,795	10,761
1897 .....	40,965	4,433	41,690	4,589	81,380	9,168	100,585	11,073
1898 .....	35,594	3,867	44,264	4,817	93,205	10,106	138,975	14,975
1899 .....	52,580	5,965	101,950	11,161				

<sup>1</sup> It is reported that a refrigerator plant has just been installed on a sailing vessel between San Francisco and the Hawaiian Islands and refrigerated compartments will be open for perishable articles.

In this connection it is interesting to note that thus far the total shipments from the Pacific coast have not been large. The following table shows the exports of butter and cheese in recent years from the two principal exporting districts—San Francisco and Puget Sound. By comparing the two tables it will be seen that only a small part of the total exports are sent across the ocean. As a rule, less than 25 per cent of the butter leaving the Pacific coast goes to China, Japan, and Hongkong. A large proportion of the exported butter is packed with brine in firkins.

*Exports of butter and cheese from San Francisco and Puget Sound, 1893-1898.*

[From Commerce and Navigation of the United States, Treasury Department.]

Year ended June 30—	San Francisco.		Puget Sound.	
	Quantity.	Value.	Quantity.	Value.
<b>BUTTER.</b>				
	<i>Pounds.</i>	<i>Dollars.</i>	<i>Pounds.</i>	<i>Dollars.</i>
1893 .....	409,428	84,242	6,116	1,589
1894 .....	444,740	92,538	25,695	5,569
1895 .....	333,596	60,621	35,367	7,279
1896 .....	386,422	69,144	49,118	9,497
1897 .....	421,191	74,268	113,676	21,915
1898 .....	525,490	113,743	93,740	20,446
<b>CHEESE.</b>				
1893 .....	227,491	29,712	11,301	1,252
1894 .....	239,580	31,176	2,628	386
1895 .....	218,805	26,374	6,502	696
1896 .....	246,773	28,107	5,957	720
1897 .....	352,202	39,225	19,664	2,499
1898 .....	382,850	41,463	12,623	1,707

UNNATURAL CONDITIONS OF HOME MARKETS.

Although as much butter is probably made in California as is used in the State, the production is so uneven that at certain seasons of the year it is found necessary to import from the East. Large quantities of cheese are also sent from New York and Wisconsin to supplement the output of the home factories. Frequently the goods shipped in are not the best. They usually sell well, however, as they meet little competition with superior grades. This peculiar condition will not last when the Coast production has further increased.

DAIRY MANAGEMENT.

The various grain feeds commonly used by dairymen in the East are seldom used in California. The feeding stuffs principally depended upon are natural pasturage, alfalfa, roots, and hay. The climate is so mild that the pasture season is unusually long; in fact, in some districts it has no end. In Humboldt County grain is not fed; cows are pastured the entire year. The pasture is principally red clover and Italian rye grass, and it is supplemented in fall and winter with green peas, carrots, beets, corn fodder, and hay. That the cattle do well with this care is shown by the fact that some herds of grade stock average over 300 pounds of butter per year, and the cows, as a rule, are in good condition.

In the alfalfa districts one hears almost incredible reports concerning the productiveness of the soil. Enormous crops are common, and five or six cuttings a year are not unusual. Irrigation is practiced to a considerable extent. Here, too, grain is seldom used. When cows are grazing they are usually given a small amount of hay at night, and a little bran is occasionally fed. One dairyman, who paid \$175 an acre for his 40-acre ranch, reports that he receives about \$100 per month from the creamery for the milk of his 30 cows. He uses no grain, pastures eight months, and feeds hay four months each year. His herd consists of ordinary grades and fairly represents many others which have been built up within a short time from stock which is better for beef production than for the dairy.

It is stated on good authority that a dairyman in Yolo County fed 90 milch cows in a corral from March 10 to July 18, 1897, on alfalfa cut from 32 acres. No other feed was used. The cows gave satisfactory results in milk yield and were in better condition at the close of the period than at the beginning. The custom of keeping cattle out of doors is made possible by the prevailing mild climate. On many ranches the animals never go under a roof to be milked or for any other purpose.

These facts make it evident that the California dairymen have good cause to boast of their ability to produce milk cheaply. As might be expected, they have much room for improvement. They admit that in many ways their methods are extravagant and not a few of them are leading in movements toward economy. The more careful selection of cows for the dairy and especially the selection of good stock for breeding is a line of improvement which would show splendid results. This general subject was fully discussed in an early bulletin of the Dairy Division of this Bureau (*Dairying in California*), and need not be further referred to here.

#### BEET-SUGAR BY-PRODUCTS.

But something should be said of the use as feed of sugar-beet pulp and tops, which, though comparatively recent, is very common in some localities. Sugar beets are extensively raised in the vicinity of beet-sugar mills, of which there are several in the State. Three such districts were visited, namely, Alvarado, Watsonville, and Salinas. As a matter of general interest, it may be stated that a good crop of beets runs about 15 tons to the acre, and the price for the year 1899, as agreed upon in advance by the sugar companies and the farmers, is \$1.50 per ton. During the harvesting season there is on some days an almost continuous procession of two, three, four, and six horse beet wagons on every important road leading to the factories. The roots are loaded onto strong nets in high wagon racks and are quickly





FIG. 1.--A CALIFORNIA DAIRY HERD.



FIG. 2.—COMBINED DAIRY AND SUGAR-BEET RANCH.



tumbled into the bins by raising one side of the net with the aid of a steam engine and tackle.

*Sugar-beet pulp.*—Sugar-beet pulp,<sup>1</sup> which is the principal by-product in the manufacture of beet sugar, is usually sold for 25 to 30 cents a ton at the factory. Last year the price was as high as 50 cents. As it can be held a long time in silo and is fed to best advantage when old, it is available the entire year. The use of fresh pulp is said to reduce the milk flow. It is supposed to be good when a few weeks old and better at six months, and will keep two or three years.

When fresh the pulp is piled or placed in a silo (Pl. II, fig. 1) where it remains undisturbed until needed for use. The material is so soft and moist that if a large pile is dumped in the corner of an inclosed space it will gradually settle until the surface is almost level. Of course the top part decays, and after a time the entire mass is covered with a protecting layer from 3 to 6 inches in thickness. Within a few months the individual pieces of beet which were originally 2 or 3 inches long and quite slender are broken down, and the appearance of the material reminds one of cold mush, grayish brown in color. Three tons of fresh pulp make about 1 ton cured.

Pulp has a tendency to fatten and it is given to beef cattle without the addition of any other food, but for milch cows its effect is found to be best when used with a little grain or hay. Without these latter it is supposed to produce a thin and watery milk. One feeder uses corn with pulp, another feeds about 3 pounds of bran daily. When pulp is fed in considerable quantity the animals do not care for water and may go for months without a drink. A feeder who has been using this by-product several years complains that when his cows have been fed for a long time on pulp their calves are likely to come weak and be troubled with scours. Another dairyman of less experience who feeds the pulp fresh states that in his observation it has no bad effect on the calves.

A herd of 200 milch cows kept near a beet-sugar factory about 40 miles south of San Francisco is given a daily ration of 60 pounds of pulp, 5 pounds of mixed ground grain, and a little hay. The cows were seen in the pasture and appeared to be in good health and flesh. The milking cows averaged almost 2 gallons each per day. Their

<sup>1</sup> The average analysis of diffusion pulps is given by Mr. G. L. Spencer in the 1898 Yearbook, as follows:

Moisture .....	89.09
Nitrogenous matter.....	.92
Digestible carbohydrates.....	6.52
Indigestible carbohydrates.....	1.98
Fat .....	.09
Mineral matter.....	1.40
Total .....	100.00

milk is shipped to a dealer in San Francisco, who pays  $12\frac{1}{2}$  cents per gallon for it the year through and  $1\frac{1}{8}$  cents per gallon for railroad freight. The production is greatest from February to May. Butter made from milk of this herd, for experimental export, was found to have exceedingly good body, a satisfactory flavor, and an apparently first-class keeping quality.

On a ranch near Watsonville, which supplies milk to a creamery, pulp has been used a few months each year for the past eight years. About 100 pounds a day are given to each animal.

It is the general opinion that pulp causes the butter to be hard.

*Sugar-beet tops.*—By “beet tops” is meant the leaves and the extreme top parts or crowns of the beets cut off when the beets are being piled ready for hauling. They are available during the harvesting of the crop, which lasts about three months. (See Pl. II, fig. 2.) This portion of the crop has some fertilizing value, and it is often plowed under on that account. Indeed, some beet-sugar companies which own large tracts of land forbid the removal of the tops. But considerable quantities of beet tops are fed and good results are claimed. The market value of this feed depends almost entirely on the prices of other feeding stuffs. When feeds are high, tops sell for \$3.50 to \$4 per acre on the ground; this year (1899) the price is about \$2.50. It is best to allow the tops to wilt two or three days before being gathered and fed. They are then easily handled and not as liable to physic the cows as when used fresh. If they become crisp, a few green leaves are mixed with them before feeding. Unlike the pulp, they cause the animals to desire a large amount of water. Many farmers feed the tops alone, but it is claimed to be better to use a little bran with them. Evidently they are satisfactory to the cows, as little else is eaten when the cows are turned out to pasture. Some people claim that beet tops give a peculiar flavor to the butter, but only a few made this criticism.

One dairyman brought his entire herd of 90 grade Durham and Holstein cows from his own ranch to a beet farm where he had bought the privilege of using the tops. After the crop has been gathered he will move back to the home place. At the date of the visit of the writer the cows had been fed on beet tops five days and were running on wheat stubble. The owner stated that their milk yield had doubled in that short time, the average being almost 2 gallons a day. Before the removal, hay was the principal feed. This man makes the butter himself and sells it in the local market at highest San Francisco prices. It is always hard when he is feeding beet tops. A dairyman who feeds beet tops two or three months each year states that one September he sent a barrel of butter made from beet-top milk to a mining camp. It was packed in rolls and covered with brine, and it lasted so long, remained hard, and kept so well under unfavorable conditions that it attracted much attention, and orders were received for more of the same kind.





FIG. 1.—SUGAR-BEET-PULP SILO.



FIG. 2.—WILTED BEET TOPS FROM THE FIELD READY FOR FEEDING.



## CALIFORNIA CREAMERIES.

There are about 300 creameries in California, and, judging by the few visited and what was reported of many others, they are well equipped and capable of doing good work. It appears that they are, as a rule, profitable investments. The charge for making butter is commonly as high as  $3\frac{1}{2}$  cents per pound, and until quite recently creameries charged  $4\frac{1}{2}$  cents. One establishment, now receiving daily 10,000 pounds of milk from 70 patrons and averaging about 7 tons of butter per month, has been in operation four years, and during that time almost \$5,000 from the regular earnings have been invested in permanent improvements, besides paying good dividends. Inasmuch as it took some time to grow from a small beginning, this is a good record.

As a rule, the creameries run every day of the year. The output of the one just referred to, which is in an alfalfa district, is largest in May, being  $8\frac{1}{2}$  tons last May; in April 8 tons were made; in November  $6\frac{1}{2}$  tons; and in December  $5\frac{1}{2}$  tons, the smallest monthly output.

In equipment the creameries are quite similar to those in the East. Box and combined churns, separators, vats, in fact, practically all of the apparatus, is from the East. One plant, receiving in September, 14,000 pounds of milk a day and the cream of as much more from its two skimming stations, uses an ice-making machine capable of producing 3 tons of ice in a day; the direct expansion system is used. A large tank of brine is suspended near the top of the butter room, and when it is desired to shut down the ice machine the brine is thoroughly cooled and it keeps the temperature in the workroom low until the machinery is again started. This creamery had the honor of making and packing in 3-pound cans 3 tons of butter for the U. S. S. *Oregon* for her famous trip around the Horn. The butter was made in the usual way, except a little drier. It was reported to have been good to the last.

## PAYMENT FOR MILK.

The method of payment for milk, as explained at two cooperative creameries, is as follows: Composite samples of each patron's milk are tested by the Babcock test once or twice every month, and a statement of the amount of milk delivered by each person and the average tests is handed to the secretary early in the following month. The total amount of butter made and any deliveries to patrons are also reported at the same time. The secretary computes the amount of fat brought by each patron and the total. The overrun is then determined (and it is usually found to be about 16 per cent). The fat delivered by the different patrons is increased in the proper proportion and each is credited with the delivery of a certain number of pounds of butter. The receipts from sales of butter made during the month are reduced by the creamery charge for making (3 or  $3\frac{1}{2}$  cents per pound), and the net

average rate to be paid to the patrons is determined by dividing the amount of money remaining after this reduction by the number of pounds of butter delivered. The amount due each patron is then found by multiplying the number of pounds of butter credited to him by the average rate. Any charges for butter are deducted, and checks for the balance are delivered about the middle of the month.

The method may be illustrated as follows: Suppose a creamery receives in June 30,000 pounds of milk testing 3 per cent fat from A; 40,000 pounds of 3.4 per cent milk from B; 50,000 pounds of 3.7 per cent milk from C; 60,000 pounds of 4 per cent milk from D, and the total amount of butter made is 7,550 pounds. The operator reports these figures to the secretary, who fills them in the first two columns of a blank form, as shown below; the remaining numbers are then calculated from them and the data received from the sales agent. The work is sometimes done with great accuracy by carrying the decimals out several points, so that each patron always receives the exact number of cents due him. Frequently the secretary of the creamery slightly increases or decreases the amount to be distributed by changing the rate of payment a few hundredths of a cent per pound so as to enable him to use round numbers in his calculations instead of awkward figures. The difference is adjusted the following month. This system of borrowing from or loaning to the next month is very sensible. It greatly simplifies the secretary's work and, at the most, makes a difference of only a few cents in the returns to the various patrons, and these small amounts are not taken from them or given to them, but simply borrowed or loaned for a month.

*Smithville creamery.—Statement for June, 1899.*

Patron.	Milk delivered.	Average test.	Fat delivered.	Equivalent in butter.	Amount due.	Charges.	Checks.
	<i>Pounds.</i>		<i>Pounds.</i>	<i>Pounds.</i>			
A .....	30,000	3	900	1,044	\$229.68	\$2.00	\$227.68
B .....	40,000	3.4	1,360	1,577.6	347.07	.....	347.07
C .....	50,000	3.7	1,850	2,146	472.12	1.50	470.62
D .....	60,000	4	2,400	2,784	612.48	5.50	606.98
Total .....	180,000	.....	a 6,510	b 7,551.6	b1,661.35	9.00	1,652.35

a Overrun 16 per cent.

b At 22 cents.

Fat delivered.....	6,510
Butter made.....	7,551.6

Overrun, 16 per cent.		
Sales .....	3,000 pounds, at 25.5 cents .....	\$765.00
	2,000 pounds, at 25 cents .....	500.00
	2,000 pounds, at 24.5 cents .....	490.00
	551.6 pounds, at 24.1 cents .....	132.93
	7,551.6	1,887.93
7,551.6 pounds, at 25 cents .....		1,887.90
Charge for making, 3 cents per pound .....		226.55

Amount due patrons, 7,551.6 pounds at 22 cents ..... 1,661.35

When there are many patrons it is seen that the number of calculations is very large. This laborious work could easily be lessened.





FIG. 1.—CREAMERY AT WATSONVILLE.



FIG. 2.—BUTTER CHESTS AWAITING TO BE PACKED.





FIG. 1.—CUTTING SQUARES OF BUTTER.



FIG. 2.—WRAPPING SQUARES OF BUTTER.





The column headed "Equivalent in butter" might well be omitted, thus saving one series of multiplications. Payments could be based on the amount of fat delivered, the average price per pound being found by dividing the sum to be distributed by the pounds of fat delivered, or, in the above case, \$1,661.35 by 6,510, which gives 25.52 cents as the value of each pound of pure fat. This rate, with the numbers in the column headed "Fat delivered," shows the same amounts due the patrons as obtained by the longer method illustrated above.

#### HANDLING ALFALFA MILK.

Butter made from milk of alfalfa-fed cows is liable to have a peculiar flavor unless special care is taken in the handling of the cream. It is customary to separate a very heavy cream and to hasten the ripening in order to exclude or cover undesirable flavors. The cream tests about 40 per cent fat, and the use of homemade or commercial starters is not uncommon. In one creamery the cream is stirred continually for five hours after it is put into the vat. No doubt this serves to aerate it and partially removes undesirable flavors. The cream is churned when from twenty to twenty-four hours old and the butter is immediately prepared for market.

#### CALIFORNIA SQUARES.

Practically all the best creamery butter sold on the Pacific coast is in squares of about 2 pounds each. The squares are blocks with square ends and rectangular sides. The butter is packed on a table (Pl. IV, fig. 1) fitted with sideboards as high as the squares stand when on end. The top surface is carefully leveled even with the table sides, and the squares, a number at a time, are cut by wires. They are wrapped in parchment paper (Pl. IV, fig. 2), and packed on end in heavy wooden chests (fig. 1). This method of handling butter is excellent in some respects, but it is subject to criticism on two important features: First, there is now no uniformity in the weights of the squares. One creamery sends cases of sixty  $1\frac{3}{4}$ -pound squares, or 105 pounds, to Sacramento, and to the same market another creamery sends cases holding sixty squares, aggregating 101 pounds. This latter creamery also sends to San Francisco cases holding sixty squares of 93 pounds. It must be both confusing and annoying to handle squares of such varying weights, and no really good reason for the practice was found. Doubtless many people who purchase butter do not notice the difference in weights, but consider all squares alike, and the seller who can shave off the most without being suspected is the gainer. Such competition is not only discreditable but dishonest. The second criticism of the method of marketing butter relates to the packages. Eastern dealers have learned that it

is more economical and satisfactory in many ways to use cheap but neat boxes for shipping, which do not have to be returned, than to use the heavy and expensive trunks or chests that were so common only a few years ago. These latter are continually being lost and broken, cause annoyance at both ends of the line, and require much labor for proper cleaning (and this is too often neglected), while the cheaper packages have not these objections.

#### CHEESE MAKING.

California dairymen and commission men are willing to admit that their State does not produce much cheese suitable for export. As a rule it is soft, open, and moist, and must be used soon after it is made.

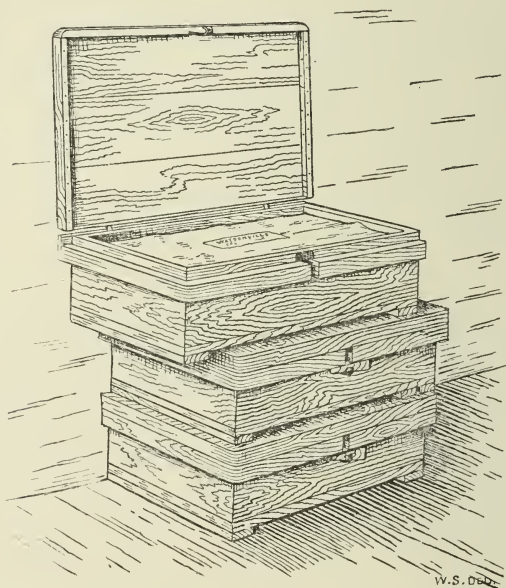


FIG. 1.—Butter packed ready for shipment.

The trouble, in all probability, is due to improper methods of manufacture, and the surest method of remedying the matter is to teach the science of cheese making and the systems successfully followed elsewhere. If such instruction were offered there is no doubt but that those interested would avail themselves of it.

Only one cheese factory was visited—a private concern on a ranch of 4,000 acres. Here the milk from 130 cows, mostly grade Durhams, is manufactured into “Flats” and “Young Americas.” The factory is a neat little one-story, square, brick structure, containing a curing room on the main floor and another below the level of the ground for use in hot weather. It is well equipped for making a fine article of cheese.

## CITY MILK SUPPLY.

As in many other parts of the country, the business of supplying milk to California cities is in an unsettled state. There is a lack of cooperation between milk producers, health officers, and milk consumers, which is detrimental alike to the interests of those who have good milk for sale and those who wish to purchase it. Methods adopted by public officials for improving the milk supply sometimes result in more harm than good.

Unclean dairies have been so widely advertised in official reports and newspaper articles that many citizens think well-conducted dairies do not exist, or, if they do, no way is known by which one can be assured of getting their milk. And many persons will go without milk whenever possible rather than run the risk of getting the dangerously impure article which they are convinced is very common. Thus the scare articles have the effect of reducing the production and use of impure milk; but they have the same effect also on the use of pure milk. It is unfortunate that the excellent features of the best dairies are not given as much prominence as are the defective features of the worst, so as to show those interested that good milk is on the market as well as bad. A practicable plan by which this could be accomplished could easily be followed, greatly to the benefit of all concerned.

Although only a few dairies were visited, it was readily seen that at least a part of the milk going into Sacramento and San Francisco is produced with great care and can be relied upon as a safe and wholesome food. As already suggested, if these first-class dairies and others like them could be brought to the attention of the public as forcibly as the worst types, a decided step would be taken toward the improvement of the general city supply.

## DAIRY EDUCATION.

In striking contrast with California's characteristic energy in advancing the interests of many of her industries in every possible way, the one method of promoting dairying, which in other States is considered of the greatest importance, has thus far been neglected. The State is doing nothing in the line of special dairy instruction, and her dairy interests are suffering in consequence. The reason may be that this branch of agriculture has not until recently become one of the important industries of the State, and those having power to assist in its promotion have not yet realized its great possibilities. Efforts to establish a State dairy school have been made, but without success. It was a subject of discussion at the dairymen's convention, and its friends will continue to agitate it, hoping that a school will be opened in the near future.

The necessity for such a school is readily seen. In the past few

years there have been many improvements and changes in dairy operations, and the improvements and changes still continue. Butter and cheese makers who now follow comparatively recent but really out-of-date methods are working at a great disadvantage. New forms of machinery are constantly being introduced, methods of manufacture are being perfected, market requirements are becoming more strict, and competition is growing more keen. In order to keep up with competitors at home and abroad it has been necessary to provide for giving instruction in the latest dairy methods, and special schools have been established in all the leading dairy States to meet this urgent need. It has been found best to connect them with State agricultural colleges, making use, so far as possible, of the latter's equipment.

In a few States splendid buildings have been erected for the exclusive use of the dairy schools. In other dairy States, where there is less call for instruction, there is less pretentious equipment, but the training offered is none the less complete. At Cornell University, New York, there is a building, erected and equipped at a cost of \$50,000, devoted exclusively to dairy instruction, and every year about seventy-five men are given a three months' course of lectures in breeding and feeding of dairy cattle and the manufacture of butter and cheese and practical work in a model creamery and cheese factory. At the State experiment station of the same State a \$40,000 building has recently been erected to be used chiefly as a laboratory for studying dairy problems for the benefit of the dairy interests of the State. At Madison, Wis., there is another dairy school building, which cost about \$40,000 and where more than a hundred dairy students are trained every winter. The wonderful growth of dairying in that State is attributed largely to the influence of the dairy school, graduates of which can be found in charge of successful cheese factories and creameries in almost every county. The dairy school at Ames, Iowa, is conducted in connection with a large creamery. Students are in attendance at all times of the year. Special sixteen-weeks' courses are given to beginners and a four-weeks' winter course is conducted each winter for experienced butter makers. Over 100 students are instructed every year. The cost of maintaining the school is less than \$3,000 per year, and a part of this is earned by the creamery. This school and others have furnished experienced butter and cheese makers to California. The other leading dairy States are also well equipped for giving instruction. Quite recently the legislature of Kansas appropriated \$34,000 for building and equipping a dairy school in that State.

Special instruction in dairying is offered at more or less well-equipped schools in thirty-one States. California is the only one in which the industry is at all prominent that is not on the list. The need of a dairy school in California is very apparent. The annual reports of the



State board of trade show the importance of the dairy industry as compared to others. The value of California dairy products is equal to two-thirds the value of her gold output, and far exceeds the value of any other mineral product. The dairy products are worth almost half as much as the wheat crop and about half as much as the combined crops of all kinds of fruit. The receipts from sales of butter, cheese, cream, and milk amount to nearly double the annual expenditures for the support of the public schools. According to the last census California ranks in dairying with other States as follows: Seventeenth in total number of cows; seventeenth in total butter product; ninth in total cheese product. Yet thirty-one States are ahead of her in encouraging and promoting dairying by offering special dairy instruction. It is seen that the dairy interests of many of them are smaller than those of California, both in toto and in comparison with other industries.

It is said to be a difficult matter to find capable operators of butter and cheese factories; and the same is true of helpers, even though these latter receive higher wages than farm laborers. As stated above, some well-trained factory operators have gone to California from other States. In addition to these there are some, of course, who have been successful in picking up their business at home and a few who have gone East for their dairy training and then returned to the State. But the majority of the butter and cheese makers of any large State will not be as well trained in their professions as they should be for the good of their work until a dairy school is maintained in that State and they shall have availed themselves of its advantages. This applies with special force to California, because it is so far from other leading dairy States and the expensive journey to their schools will prevent many from going away for dairy training who might do so if the distances were shorter.



U. S. DEPARTMENT OF AGRICULTURE.

BUREAU OF ANIMAL INDUSTRY.

D. E. SALMON, Chief.

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# RABIES.

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REPORT OF THE COMMITTEE ON PUBLIC HEALTH  
OF THE MEDICAL SOCIETY OF THE  
DISTRICT OF COLUMBIA.



WASHINGTON:  
GOVERNMENT PRINTING OFFICE.  
1900.





## LETTER OF TRANSMITTAL.

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U. S. DEPARTMENT OF AGRICULTURE,  
BUREAU OF ANIMAL INDUSTRY,  
*Washington, D. C., July 9, 1900.*

SIR: I have the honor to transmit herewith a report on rabies which was prepared by the committee on public health of the Medical Society of the District of Columbia and unanimously adopted by that society on June 13, 1900, and as this disease has for several months existed among the animals of the District of Columbia and vicinity I recommend its publication as Bulletin No. 25 of this Bureau.

Respectfully,

D. E. SALMON,  
*Chief of Bureau.*

Hon. JAMES WILSON,  
*Secretary of Agriculture.*



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# R A B I E S .

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## REPORT OF THE COMMITTEE ON PUBLIC HEALTH OF THE MEDICAL SOCIETY OF THE DISTRICT OF COLUMBIA.

### GENERAL STATEMENT.

At the meeting of the Medical Society of the District of Columbia, held April 11, 1900, the following preambles and resolution were adopted:

Whereas legislation concerning hydrophobia is contemplated by Congress; and

Whereas conflicting and even incorrect views as to the reality and nature of the disease have been expressed; and

Whereas this society, under the circumstances, should place itself upon record regarding the true status of the disease,

*Resolved*, That the matter be referred to the committee on public health for such action as it may deem proper.

In compliance with this action of the society the committee on public health, after having somewhat carefully reviewed the literature of the subject, giving due consideration to the facts and arguments presented pro and con, presented this report:

In view of the fact that this report is intended, as stated in the preamble, to be an expression of the views of the society upon the subject under consideration, it is deemed advisable to present, in a supplement to the report proper, additional facts and statements gathered from the literature upon the subject, which tend to further strengthen and justify the conclusions drawn. However, it is not to be inferred that the members of the society need any arguments to convince them of the reality of rabies or that the committee can further enlighten them concerning the disease, for they are, presumably, as well, if not better, informed upon the subject than are the members of the committee. Nor is this report intended to meet the objections of those who refuse to accept the biological test and who at the same time can not or will not believe the testimony, such as that here presented, of competent witnesses. Such persons could not be convinced—that is, if they are sincere—by seeing a case, even; simply because, having no other cases for comparison, there would be no means of verification.

Of the reality of the existence of rabies, or hydrophobia, both among man and animals, no reasoning or reasonable persons who will take

the trouble to investigate can for one moment entertain a doubt; and until such an investigation has been made no one has any right to make a positive assertion. That many persons, including physicians and other men of prominence, have never seen a case (although it may indicate the comparative infrequency of the disease, particularly in man) is no argument whatever against its existence. The same might be said in regard to a number of other diseases concerning which a doubt has never been expressed, or of the existence of a disease in a foreign country or city, for example.

In the index catalogue of the Surgeon-General's Office there are 31 pages, besides a large drawer filled with cards, devoted to titles of articles upon hydrophobia or to reports of cases that have occurred in nearly all parts of the world. These reports come mainly from perfectly reliable sources, and the articles, at least most of them, are by men of recognized authority, who believe in the reality of the disease and have had more or less experience with it.

The very eminent commission, consisting of Sir James Paget, president; Dr. Lauder Brunton, Dr. G. F. Fleming, president Veterinary College of London; Sir Joseph Leister, Bart.; Dr. Richard Quain, Sir Henry Roscoe, Prof. Burdon Sanderson, and Prof. Victor Horsley, appointed by the House of Commons of England in 1896 to investigate the new treatment for rabies as conducted by Pasteur, after a most searching and painstaking inquiry reached the conclusion that M. Pasteur had discovered a preventive method for rabies similar to that of vaccination for variola. Is it to be presumed that these gentlemen would have made this statement had they not believed in the existence of the disease? The select committee of the House of Lords appointed at a more recent date to examine into the subject of rabies among dogs sought and obtained the testimony of the most eminent authority of England upon the subject. This testimony alone, which is recorded in a book of 302 pages, is more than sufficient to establish the reality of rabies. Dr. Cabot, of the board of health of New York City, says he has heard from a number of prominent medical men, and none of them doubt the existence of the disease. He says the representative men in this country and in Europe—the men who do the thinking and teaching—recognize the importance of the subject. Dr. Welsh, of Johns Hopkins, says he believes most cases diagnosed as rabies by reputable physicians are rabies.

Moreover, rabies is an acute specific disease due to a specific cause, a virus—almost certainly a living germ or elaborated by a living germ—that is transmitted by inoculation only. This process, when it is accomplished, is brought about almost without exception by an animal which is suffering from the disease conveying to the wound inflicted by his teeth, either upon another animal or upon man, saliva which contains the virus. Of course, reference is not made here to

laboratory methods by which the disease is propagated experimentally by artificial inoculation.

The striking similarity, if not exact identity, of symptoms (and this anyone who reads the cases on record will observe) in man and animals, widely separated both as to time and place, can be explained in no other way than upon the assumption that the disease is due to a specific cause; and the fact that the disease has been transmitted from animal to animal, month after month, year after year, from the very beginning, without decreasing in virulence, can not be accounted for unless it is admitted that the virus is a living germ. Furthermore, the virus has been found to exist in the salivary glands, the saliva, the mammary glands and the milk, pancreas, lachrymal glands, and suprarenals, while its absence is noted in the liver, spleen, kidneys, urine, blood, and the bulk of the tissues; and, indeed, Memmo, of Rome, furnishes strong proof, asserting almost positively, that he has found the germ. He believes that Foll, Revotta, Ferran, and Spinello have seen the same germ also.<sup>1</sup> Besides, Nocard and Paul Best showed a number of years ago that saliva filtered through plaster lost its virulence; that is, that the virus was left on the plaster, and therefore most probably a germ.

The assertion that the disease is transmitted almost always by the bite of a rabid animal is based upon the facts in the case as testified to by any number of competent witnesses; and the assertion that it is transmitted only by inoculation is based upon a knowledge, in part inferred from analogy, of the nature of the virus, direct experiment, and the absence of any proof or possibility of proof to the contrary.

The claim occasionally made by some that ungratified sexual desire, long deprivation of food or drink, exposure to the intense heat of the sun, particularly during July and August, chaining or muzzling continuously, will produce the disease in the dog or other animal has never been substantiated and is contrary to the facts in the case. Dogs have been made to undergo all these cruelties now and then by perhaps overzealous investigators, but always with negative results. Such a claim, under the circumstances, is tantamount to the claim also sometimes advanced that the disease originates spontaneously or is produced *de novo*, which, like the charge that Pasteur has produced a new disease by his method of preventing hydrophobia, was proven by Pasteur himself to be impossible when he, in 1860, by his long since world-renowned experiment before the Academy of Sciences of Paris, exploded the theory of spontaneous generation.<sup>2</sup> The original jar containing the sterilized material, still with no signs of life, is yet to be seen at the Academy. It may as well be claimed that an artificial

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<sup>1</sup>Journal of American Medical Association, vol. 32, p. 327. Hereafter referred to simply as Journal.

<sup>2</sup>Journal, vol. 25, p. 587.



egg can hatch, or that a hen's egg can produce anything else but a chick, as to the claim that rabies can originate *de novo* or can be developed in any other way than from the specific virus of the disease. Surgeon-General Sternberg says that if there is anything definitely settled in medical science it is that rabies is an infective disease which is transmitted from animal to animal and from animal to man.

It is the laboratory method and the Pasteur treatment, however, that furnish the absolute proof of the inoculability and specific nature of hydrophobia. Dr. Kierle, of the Pasteur Institute, Baltimore, says that daily throughout the civilized world institutions administer the Pasteur treatment, demonstrating that rabies is a specific infectious neurosis, and that no other disease is capable of producing identical signs and symptoms. He further says that rabies is capable of unlimited propagation by experimentation. In such experimentation the inoculating material preferred is a portion of the floor of the fourth ventricle; and that by this method the Institute of Paris, starting with the medulla of a cow that had rabies from the bite of a rabid dog, has passed the disease from rabbit to rabbit until the four hundred and eightieth remove has been reached. Two rabbits have been trephined each time, making 960 rabbits that have taken the disease. Dr. Kierle himself, from the medulla of a cow that had rabies from the bite of a dog, has reached the one hundred and twenty-eighth remove, and has meanwhile given the disease to 738 rabbits. Using the medulla of a rabid horse, he has passed the disease from rabbit to rabbit until the tenth remove has been reached; and three times he has produced the disease in rabbits<sup>1</sup> from the virus from the human subject.

If these facts are admitted—and there is every reason why they should be—and if it is also admitted that the Pasteur preventive treatment has saved even one life, either in animal or man—and we believe the facts collected in the supplement prove that it has saved hundreds, if not thousands—then all the claims made in this report as to the nature and reality of the disease have been wholly substantiated, for upon no other possible assumption could the facts and treatment be explained.

#### HISTORY AND PREVALENCE.

Rabies has been known from very early times. Celsus described it, and a thoroughly accurate account of it appeared in an ancient Hindu work, probably ten thousand years ago. It existed all through the middle ages, and has prevailed and now prevails in nearly every country in the world, Lapland, Australia, and islands in the Pacific being possible exceptions. There are some sections where the disease prevails all the time; others, where it is unknown, although it is likely

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<sup>1</sup> New York Med. Record, Feb. 19, 1898, p. 258.



to be introduced at any time unless the most vigorous quarantine is enforced against it. In locations where it has existed it may nearly or entirely disappear, only to break out afresh and perhaps become epizootic owing to its fresh introduction by some stray or imported dog. It exists at all seasons of the year. Of 2,520 cases, there occurred 704 in the spring, 621 in the summer, 608 in the autumn, and 587 in winter. (Johnson's Cyclopedia.)

There are good and sufficient reasons for believing that rabies has prevailed in this District, at least at times, for many years, and positive proof that it has done so each year since and including 1895; for the Bureau of Animal Industry demonstrated by the biological test its existence in 1895 in 2 cases, in 1896 in 5 cases, in 1897 in 3 cases, in 1898 in 7 cases, in 1899 in 19 cases, and in 1900 (to March 31) in 15 cases.<sup>1</sup>

The following letter from the health officer of the District of Columbia adds information as to the existence and prevalence of the disease heretofore:

HEALTH DEPARTMENT, DISTRICT OF COLUMBIA,  
*Washington, May 10, 1900.*

DEAR DOCTOR: An examination of the records of this department shows that since August 1, 1874, there have been 7 deaths of human beings from hydrophobia, in this District, as follows:

Record No. 14140: On December 19, 1877, William F. P., white, 17 years old, a butcher by trade, died on the heights of Georgetown from hydrophobia, the result of a dog bite, after three days' illness; he was attended by Dr. Louis W. Ritchie.

Record No. 26751: On December 7, 1880, John T. D., a white boy, 8 years old, died on G street, between Twenty-third and Twenty-fourth streets NW., from hydrophobia, after three days' illness; he was attended by Dr. William Ward.

Record No. 87009: On November 3, 1892, Charles H., colored, 27 years old, a laborer by occupation, died at 620 Third street SW., after four days' illness, under the professional care of Dr. Phillip B. Brooks. The patient had been bitten by a dog, but the cause of death was certified to as cerebral congestion, with a memorandum, however, to the effect that he was supposed to have died with rabies. A biological test was made by Dr. Kinyoun, which Dr. Presley C. Hunt, who was interested in the case, informs me, showed conclusively that the patient suffered from hydrophobia.

Record No. 98411: On September 25, 1894, John F. N., white, 12 years old, died at 1355 K street SE., from hydrophobia, after three and one-half days' illness; he was attended by Dr. Otto W. Schelksohn.

Record No. 99183: On November 14, 1894, Virginia G. M., white, 3 years old, died at 2915 Dumbarton avenue NW., from hydrophobia, after three days' illness; she was attended by Dr. Clifton Mayfield.<sup>2</sup>

Record No. 104454: On October 13, 1895, Bridget S., white, 54 years old, died at 224 L street NW., from hydrophobia, after four days' illness. She was attended by Dr. A. Behrend.<sup>3</sup>

Record No. 114571: On July 21, 1897, Charles E. S., white, 18 years old, a tinner by trade, died at 401 South Capitol street from hydrophobia, after three days' illness. He was attended by Dr. M. F. Thompson.

The record of the cases of rabies which have occurred among domestic animals does not extend back of 1895. During that year there were 3 cases; in 1896, 2; in

<sup>1</sup> Bu. An. Ind. Circ. No. 30, p. 6.

<sup>2</sup> Case published in Va. Med. Monthly, Richmond, 1894-95, vol. XXI, pp. 1078 to 1085.

<sup>3</sup> Case published in Jour. Pract. Med., New York, 1895-96, vol. VI, pp. 242-244.

1897, 3; in 1898, 3; in 1899, 17; in 1900, up to the present time, 18. These numbers do not include any cases that were merely suspected, even though the clinical symptoms were reasonably well marked, except those in which the diagnosis has been confirmed by biological tests made by the Bureau of Animal Industry of the United States Department of Agriculture. Ten suspected cases are now under investigation by that Bureau.

If there be any further information which I can furnish, I shall be pleased to do so.

Yours, very truly,

WM. C. WOODWARD, M. D.,  
Health Officer.

Dr. J. W. CHAPPELL,

*Chairman Committee on Public Health, etc., Tennallytown, D. C.*

#### SYMPTOMS.

As the symptoms of rabies have been frequently described and can be found in any text-book upon such subjects, they will be referred to here but briefly. The symptoms which correspond with, and are characteristic of, the three stages of the disease are—

*First*, the prodromal symptoms.

*Second*, the furious symptoms, or those of the attack proper.

*Third*, the paralytic symptoms, or those of the final stage.

If the symptoms of the second stage are absent or so slight as to escape notice, particularly if the first stage also is absent or of short duration, there exists what is known as the paralytic form of the disease. This may occur occasionally in man as well as animals, and is the form of the disease with which rabbits are usually affected.

In man the prodromal symptoms are indisposition, dread, and sleeplessness. The attack is ushered in generally by dyspnoea and a difficulty in swallowing. This difficulty in swallowing, particularly liquids, which is due to spasm of the muscles of the pharynx, rapidly increases. The spasms soon extend so as to involve first the muscles of the neck, and later those of the trunk and limbs. Any attempt at swallowing at this stage, or even the sight or sound of liquids, notwithstanding the patient's thirst is intense, is sufficient to bring on the most violent and distressing attacks of general convulsions. It is this peculiar and characteristic phase of the disease that has given rise to the term hydrophobia. The special senses become very acute, particularly those of hearing and cutaneous sensations, so that sounds and currents of air are sufficient to bring on the convulsive attacks. Stages of furious excitement or actual mania occur. Fever often reaches 103° to 104° F. Death may occur during this stage from asphyxia, from involvement of the diaphragm and other muscles of respiration; but more often the attack passes into the third stage, characterized by progressive weakness, and paralysis of the muscles of the limbs and trunk, death taking place by cessation of respiration. The duration of the disease is usually from two to five days. Those who have witnessed this form of the disease in man have characterized it as being

of the most terrible nature, and the sufferings of the patient as being beyond description. He, however, neither barks like a dog nor bites or otherwise attacks those about him. A change in disposition, particularly by seeking seclusion and manifesting signs of irritation upon being disturbed either by other dogs or by persons, particularly his master, is characteristic of the first stage of the disease in the dog.

In the second stage the dog's voice becomes affected, owing to incipient paralysis of the muscles of the larynx, and his bark or howl is said by those familiar with this symptom to be almost pathognomonic. His irritability increases, and he has spells, apparently uncontrollable, during which he attacks surrounding objects—chairs, carpet, his kennel, etc. These spells becoming more frequent, he wanders away from home, attacking persons as well as animals if they chance to cross his path, and, if he is naturally a vicious dog, he will go out of his way to do so. Often, too, he will chew up and swallow sticks, stones, pieces of coal, etc. Contrary to what is usually supposed by uninformed persons, he is not afraid of water, but will even plunge into streams, and in order to quench his intense thirst will make desperate efforts to gulp down the liquid, but which he has great difficulty in swallowing, owing to incipient paralysis of the muscles of the throat and lower jaw. If he is not killed, he usually returns home. The paralysis rapidly extends to the muscles of the lower limbs and trunk, involving those of respiration, and he dies. The usual duration of the disease is from four to five days, but may in very rare cases be prolonged to ten days.

The wolf, fox, and indeed most wild beasts when affected with the disease become very audacious, take to the fields and roads and will savagely attack men, horses, and cattle whenever they can find them. They usually fly at the exposed parts of the body—the hands and face; and for this reason their bites are more frequently followed by fatal results. In the cat the tiger-like ferocity predominates, and in her attacks she flies at the face and hands. The disease is sufficiently characterized in the rabbit by the fact that, while the hind legs are perfectly helpless, being paralyzed, it is able to drag itself around by the fore legs; the general health remains unimpaired and the appetite unaffected. The duration of the disease in the rabbit is from four to five days.

#### PERIOD OF INCUBATION.

The period of incubation is a variable one, depending, Pasteur says, not upon any difference in virulence of the virus, but upon the quantity absorbed. Hence it must also depend upon the character, situation, number, and severity of the bites; and this has been found to be the case. Its duration in man has been variously fixed at from 18, 20, 40, and 60 days to 2, 3, 12, and 24 months, and even longer.



The practical point is that it is usually of sufficient duration to allow the bitten person time to take the Pasteur treatment before the development of symptoms and of sufficiently indefinite duration to keep him in a state of anxiety long after all probable danger is passed.

#### DIAGNOSIS.

The symptoms of the disease in both animals and man are usually sufficiently characteristic to distinguish them. But a positive diagnosis can not be made without the laboratory test—that is, by inoculating rabbits or other animals with extract of the spinal cord of the person or animal supposed to have died of the disease. There are no sufficiently characteristic post-mortem appearances. For these reasons no one has any more right to positively pronounce a certain case followed by death as a spurious form of the disease than he has to pronounce every suspicious case genuine. Mistakes have occurred on both sides.

Drs. Head and Wilson, of the University of Minnesota, report a death which was supposed at first to be due to hydrophobia following the bite of a dog; but a post-mortem examination of the ventricular fluid and portions of the central nervous system revealed the presence of the diphtheria bacilli. Their presence was also determined by inoculation tests. The fact should be noted, however, that the patient lived 14 days after being taken ill, which was almost evidence enough itself to exclude hydrophobia.<sup>1</sup>

Record No. 87009 of the health office of the District of Columbia, and referred to elsewhere in this report, is the record of a death certified to as one from cerebral congestion, but a biological test proved it to be a death from hydrophobia.

As the symptoms of the disease are to be relied upon more than the post-mortem finding, and as it takes from 14 to 21 days for the laboratory test, the suspected dog, if he has bitten other dogs, and particularly if he has bitten a person, should not be killed, but be confined where he can do no damage. His death in a few days would be confirmatory of rabies, while, if he does not die, it would be positive evidence to the contrary.

#### MORTALITY.

It is impossible to fix at all definitely the rate of mortality in persons bitten by rabid animals, for the statistics collected previous to the laboratory method of diagnosis are not entirely reliable, and persons bitten now by animals proven rabid usually undergo the Pasteur treatment. Besides, the mortality depends upon the seat, character, and severity of the bite or bites, their number, and the particular animal inflicting them. Bites about the head, face, and neck are especially fatal, while

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<sup>1</sup> Journal, vol. 33, p. 989.



those upon the limbs, particularly if through clothing, are not attended with much danger, as the clothing tends to rub the virus off the teeth. Bites of wild animals, the wolf in particular, are perhaps in the majority of cases followed by a fatal result. The rate of mortality for all bites has been fixed as low as 10 per cent and as high as 40 or 50 per cent. The mortality of bites of very severe character, especially if situated about the head, face, or neck, has been stated to be as high as 65 or 75 per cent, or even higher. Whether we accept these figures as approximately correct or not, we know that quite a number of deaths have occurred annually in nearly every country of the world from the bites of rabid animals.

#### TREATMENT.

As there is some little evidence going to show that thorough cauterization with nitric acid immediately or within 24 hours after the infliction of the bite of a rabid animal lessens the percentage of mortality, it is therefore to be recommended, whether it is intended to take the Pasteur treatment or not.

The Pasteur method has stood the test of time, but it should always be borne in mind that it is only a preventive measure, for if the symptoms once set in, or the treatment is delayed too long, it will, like all other remedies, fail.

There were treated at the Paris Institute during the three years ended December, 1898, 21,631 persons, of whom 99 died, a mortality of 0.45 per cent. The total number of cases reported by the other institutes and here collected are 6,440, of whom 47 died, a mortality of 0.73 per cent. This gives a grand total of 28,071 cases, of whom 146 died, a mortality of 0.52 per cent.

This committee is not certain whether those who died within the 15 days limit are included among the deaths or not, except in some cases. If they are not included, of course the mortality rate would be much higher, probably as high as 1 per cent. The committee is of the opinion that these deaths should always be stated in the report, and, except in cases where too long a time has elapsed before treatment is begun, they should be included with the other deaths. However, this evidence of the low percentage of mortality after the Pasteur treatment, and an actual decrease in the number of deaths from hydrophobia in France and other countries since its introduction, ought to be sufficient evidence of its efficacy.

The very eminent commission previously referred to in this report, appointed by the House of Commons of England in 1886, after a searching, painstaking, and independent investigation of the whole subject in all its phases, including a thorough inquiry into the cases that had thus far been treated, reached the conclusion that M. Pasteur had discovered a preventive method for rabies similar to that of vac-

cination for variola. Prof. Charles Richet, delegate of the French Government, and of the Faculty of Medicine of Paris, in a lecture delivered at the annual meeting of the British Medical Association, Montreal, while recounting the remarkable achievements of Pasteur and the great good resulting therefrom to the whole world, said, among other things, that the apogee of the glory of Pasteur was the discovery of the new treatment for hydrophobia.

Such is the character of the testimony in regard to this treatment.

The following observations, original with the committee as to the method of presentation only, are offered with the hope that they will prove to be a sufficient answer to those who claim (and there are some) that the Pasteur treatment is responsible for the deaths that occur:

In 1890 (?) eight children of Baltimore were bitten by a rabid dog. All were taken to New York and underwent the Pasteur treatment. Of the eight, four died within 36 days after being bitten and 19 days after the treatment was begun. Dr. Kierle says that it takes from 15 to 20 days at least for the treatment, and 15 days additional to establish complete immunity, and hence all cases that develop the disease within 35 days after being bitten prove by this fact that they are not susceptible to treatment.

Dr. Kierle first proved the existence of rabies in the dog that bit these children by a series of inoculations upon rabbits with emulsions of the spinal cord of the animal. Later he inoculated a number of rabbits with emulsions of the spinal cord of two of the children that died. In none of them did the disease develop prior to the fourteenth day. This fact proved very conclusively that it was ordinary "street" rabies, and not that of the laboratory, which develops in from 6 to 7 days after inoculation. This test has before and since been resorted to by others with like satisfactory evidence as to the nature of the disease.

The four children who died were all bitten on the face and bare neck and the wounds were severe. Three of the other children were bitten on the arm, and the remaining one was bitten on the ear through an ear warmer.

Louise Pelletier, who died December 3, 1885, a few days after the termination of the treatment, and who was the first patient lost by the Pasteur treatment, had been severely bitten in the armpit and on the back of the neck, and did not apply for treatment until 37 days after the infliction of the wound.

Some time after this, nineteen Russian peasants clad in the skins of wild animals applied for the Pasteur treatment. They had all been severely bitten by wolves 14 days before. Of the nineteen who came, sixteen returned home well. The three who died had received numerous and disfiguring wounds about the head, and in one the broken tooth of a wolf was found at the post-mortem embedded in the tissues.

The vast majority of the fatal cases following the Pasteur treatment presents a history similar to these. They have either been bitten on the bare neck or face, have received unusually severe wounds, or have allowed a longer time to elapse than is safe before applying for treatment. In some, all these unfavorable conditions exist together. If the treatment is the cause of the fatal termination, why is it that the mortality is so much greater in this class of cases than it is in those who receive only slight wounds, or wounds upon other parts of the body than those of the head, neck, and face, or who apply promptly for treatment? The inoculations are all made into the same part of the body and all are given the same treatment, except that in the most urgent cases a shorter method is sometimes resorted to, because experience has shown that more lives are thus saved.

Moreover, why is it that pain and other distressing symptoms are usually, if not always, felt at the seat of the bite when the dreaded disease first begins to make its appearance, while at the same time the seat of the inoculations remains in a perfectly normal condition?

The claim made by some that the paralytic form that has appeared in some of the cases treated is different from the form that develops from the bite of a rabid animal is proof that the disease is due to the inoculation is untenable, because this paralytic form existed before the days of inoculation. Van Sweiten recognized it in 1771; Brent recognized it in 1822; Watson described it in 1877. Moreover, the advocates of this charge show thereby that they acknowledge the existence of the disease in the usual form. But it has been shown that all the deaths after treatment are less by a very large percentage than are the deaths from the usual form without treatment. Is it not then eminently unfair and unjust to claim that the treatment causes the disease?

#### PREVENTION.

So long as the bites of dogs are followed, even occasionally, by death of a horrible nature, and so long as the Pasteur treatment offers the only possible means of escape from such a death, there will be found those who will regard it as a duty to provide means for those dear to them to undergo the treatment if bitten by a dog or other animal pronounced rabid by experts, and will regard it as a privilege to take the treatment themselves, should they be placed under like distressing conditions. But it takes three weeks, as has already been stated elsewhere in this report, to complete this treatment, during which time the patient would be required to remain away from his family and business, unless there were an institute in his own city, which is not the case in Washington; besides, the treatment, not to mention the pain and many other annoying incidents thereto, is very expensive, far beyond the reach of many, and who, unless the community comes to their relief, would have to forego it entirely.



Furthermore, so rapid is the rate of increase among dogs and so dangerous and devastating would they become in time, that some means must be devised for their destruction; and as the community in which we live has deprived its citizens of the right to carry firearms and other weapons by means of which they might protect themselves, and as defenseless children are compelled to use the streets and public highways in going to and from school and elsewhere, it is the duty of the community to insure against the incursions of dogs, as well as to afford every other possible means of protection.

Therefore, for these and similar reasons, your committee, while approving in the main the laws now in force in the District in regard to the keeping and licensing of dogs, as well as the laws in regard to the prevention and suppression of contagious diseases among domestic animals, and while urging their strict and impartial enforcement, would recommend that they be modified or amended as follows:

*First.* To prohibit dogs at all times from appearing at large upon the street, public highways, or elsewhere, without muzzles.

*Second.* To hold the owner liable in civil action for any damage done by his dog, whether or not a record has been kept at the collector's office of said dog.

*Third.* To require the poundmaster to collect dogs during the night as well as the day, providing a separate compartment in the wagon and at the pound for each dog, and destroying them in the most humane and practical way possible.

*Fourth.* To provide for the proper and safe keeping of any dog suspected of having rabies, especially if it has bitten other dogs or a person, until it is determined definitely whether it is rabid or not. Moreover, your committee most heartily approves of the recent order of the District Commissioners requiring all dogs when at large to be muzzled, but would urge a more rigid enforcement of the provisions, as dogs are often seen upon the streets not only with ill-fitting and insecure muzzles, but with none at all, especially at night.

Furthermore, the committee would urge that said order be continued in force, if it can be done legally, until the enactment of the provision, previously recommended, in regard to the muzzling of dogs, and would suggest the advisability of issuing to each dog owner, when he applies for his license, a circular containing the laws and regulations in regard to dogs, simple instructions as to their care, and a description of the symptoms of rabies; and would call attention to the necessity of all persons earnestly cooperating with the authorities in order to insure the faithful execution of the laws now in force and to bring about the adoption of the measures herein recommended.

Finally, the committee wishes it distinctly understood that it is unequivocally opposed to maltreating dogs or other animals or causing them to suffer in any way unless it is absolutely necessary for the



good of human society or themselves. It believes that no right-thinking and fair-minded person, particularly one who claims a special fondness or tender feeling for the brute creation, can object to these measures; for their proper enforcement, in addition to affording greater security to human society—their prime object—would prevent valuable dogs from getting rabies and protect them and all defenseless dogs from the cruel attacks of larger and more vicious ones.

J. W. CHAPPELL, Chairman.

GEORGE W. JOHNSTON,

E. A. BALLOCH,

D. OLIN LEECH,

T. A. CLAYTON,

STERLING RUFFIN,

R. A. HOLDEN,

W. C. WOODWARD,

*Committee on Public Health.*

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## APPENDIX A.

### Period of Incubation.

Watson says that the period of incubation in man is probably between 6 weeks and 3 months. In some cases it has been known to be of very much longer duration. He says that according to a table of 130 cases, prepared by Mr. Hawkins, the period of incubation for five-sixths of them was between 18 days and 3 months. He reports that in two persons bitten at the same time by the same cat that had been bitten by a dog the outbreak of the disease was 2 weeks apart; also that six dogs bitten at the same time went mad in 23, 56, 67, 81, 155, and 183 days, respectively. Pasteur thought the period of incubation would average between 40 and 60 days, and said that its length depends not on the virulence, but on the quantity of the virus absorbed. Hence a long period of incubation indicates that a small amount of the virus has been absorbed.<sup>1</sup>

According to an article in the *Journal* (vol. 33, p. 1504), the period of incubation is said to vary from 20 days to 1 year. In 57.6 per cent of the cases reported it was from 50 to 120 days.

Horsley says it is not less usually than 6 weeks, but that it may last more than 2 years.<sup>2</sup>

E. Roux, in a paper read before the International Congress of Hygiene and Demography, in London, called attention to the long period of incubation of the disease, and says that the effects of the inoculations might be exhausted before the time for the development of the disease. In such a case the treatment would not, of course, prevent the appearance of the disease.<sup>3</sup>

Abba claims that the period of incubation in the dog is very variable. He says it has been proven to last 246 days, and that the only safe rule is to kill the suspected dog at once.

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<sup>1</sup>Boston Medical and Surgical Journal, May, 1886, p. 500.

<sup>2</sup>Journal, vol. 16, p. 744.

<sup>3</sup>Journal, vol. 17, p. 376.

Dr. Dolan fixes the probable limit of the period of incubation for sheep at 2 months, for pigs and horses at 3 months, and for cattle at 6 months.

Bradford says the period of incubation in man is from 20 to 60 days, rare after 3 months, still more rare after 6 months; in dogs, it is from 15 to 60 days, half of the cases occurring in less than a month; in cattle, from 1 to 3 months; in sheep, from 15 to 30 days; in the horse, from 15 to 60 days.<sup>1</sup>

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## APPENDIX B.

### Prevalence.

According to the census report of 1890 there were 63 deaths from hydrophobia in the United States.<sup>2</sup>

The bulletin of the Pasteur Institute, New York City, shows that in the year 1896 the 241 persons appearing for treatment came from 23 States.

Dr. Charles W. Dulles, who does not believe in hydrophobia, at least in its specific nature, in his report to the Pennsylvania Medical Society in 1894, says he has collected during the last 6 years reports of 78 cases, an average of 13 per year, or 1 to 4,500,000 inhabitants.<sup>3</sup>

Dr. John Ruhreah, of Pasteur Institute, Baltimore, says that there is great prevalence of the disease in Maryland and adjoining States, and that 17 of the 42 dogs examined by him proved to be rabid.<sup>4</sup>

In 1898 the Pennsylvania State board of health was obliged to quarantine against dogs in a village in the northern part of the State owing to the prevalence of rabies among horses, cattle, and swine.<sup>5</sup>

Westbrook and Wilson, in the report of the Minnesota State board of health, state that an examination of 19 suspected dogs, 16 of them were proved, by inoculation test upon rabbits, to have had hydrophobia.

Florida in 1895 added hydrophobia to the list of diseases to be quarantined against.

Fallon Cabbot, of the board of health, New York City, in the Medical News, March, 1899, says that Dr. Huidekoper made a special effort to find out the prevalence of rabies among dogs in the United States by writing to veterinarians in various parts of the country. As a result, he found that the disease was very prevalent in some sections, while in others (whole States even) there was none at all. He says that Dr. Fotheringham, of Boston, examined by the inoculation test 30 animals and that 20 of them proved to have rabies, including 1 horse and 1 cow. Rabies was found to be present in 14 of the 21 cases examined by Dr. Cabbot himself. He says Dr. Samson has seen 22 cases of rabies in animals. He quotes Dr. Welch, of Johns Hopkins, as saying that he believes rabies is more prevalent than is usually supposed; that we have means of recognizing hydrophobia as precise as those of typhoid fever—that is, by inoculation; and that he thinks most cases diagnosed by reputable physicians as rabies are rabies.

Dr. Cabbot also quotes Dr. Leonard Pearson, dean of the veterinary school of the University of Pennsylvania, as saying that he got authentic reports of the following deaths from hydrophobia in Philadelphia for the year 1896: Three men, 1 boy, 55 dogs, 3 horses, 6 cattle, 4 pigs, 1 goat, and 10 sheep.

Dr. G. W. McCaskey, of Fort Wayne College, reports two deaths from hydropho-

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<sup>1</sup>London Lancet, March 3, 1900.

<sup>2</sup>Wood's Medical and Surgical Monographs, vol. VII.

<sup>3</sup>Journal, vol. 22, p. 969.

<sup>4</sup>Journal, vol. 30, p. 1427.

<sup>5</sup>Journal, vol. 31, p. 1326.

bia after bites inflicted by dogs. No other case has ever been known in the vicinity before. He thinks that in his part of the country wild animals, such as skunks, squirrels, rabbits, and woodchucks might help to disseminate the disease.<sup>1</sup>

Dr. Alfred C. Croftan, in the *Journal* (vol. 32, p. 1012), reports what he regards as the first case of hydrophobia in southern California. The symptoms in the patient were perfectly characteristic, and injection of the cerebro-spinal fluid into rabbits caused their death.

Dr. E. P. Axtell reports in the *Journal* (vol. 32, p. 1322) a death from hydrophobia in Denver, Colo.

Reports of many other cases from various parts of the country similar to the three just cited are on record, and a careful tabulation of them would be instructive and would undoubtedly reveal very general and wide prevalence of the disease in the United States, but this work, for want of time, was not undertaken by this committee.

Rabies is more prevalent in Europe than it is in this country. This is probably due to the facts that it is an older country and more thickly settled; that there are more dogs; that the disease is disseminated more frequently by dogs and other domestic animals than by wild ones; and that the quarantine laws are not rigidly and systematically enforced simultaneously by the different countries.

Zielsen says that in Prussia from 1820 to 1834 there were annually 71 deaths from hydrophobia, in Austria from 1830 to 1847 an average of 24 to 25 deaths annually, and in Bavaria from 1864 to 1867 there was an average of 17 to 18 deaths annually. He says in France the average death rate from hydrophobia is 2 to 1,000,000 inhabitants, and in Bavaria it is 4 to 1,000,000 inhabitants.

Sir Thomas Watson, Bart., in an article on hydrophobia published in 1877, says that Mr. Hawkins had seen 10 to 12 cases of the disease in man, and that he himself had seen 4 cases, and adds that, according to the report of the register-general, no less than 334 persons died in England of hydrophobia during the decade ended 1875. He says there has been an astonishing increase of the disease in England during the last half century; that in 1844 only 2 cases were admitted into St. George Hospital, but since the beginning of the present year 13 deaths had been recorded within the limits of London registration.

From January 1 to July 1, 1889, England sent 50 persons bitten by rabid dogs to the Pasteur Institute, Paris, for treatment. During July and August of the same year 39 persons were sent. This increase in number, however, was not due to a corresponding increase in the number of persons bitten, but to the fact that the treatment had been placed within reach of the poor by the provision of a fund.

An article in the *Journal* (vol. 26, p. 439) states that rabies became very prevalent in England, particularly in London and the surrounding counties, in 1889, and that during the year there were reported to the authorities 312 cases. After the use of the muzzle the number of cases very suddenly fell, until in 1892 there were but 38 cases reported. Then the number of cases reported began to increase soon after this, and amounted to a total of 248 for the year 1894.

In the department of Loire, France, in 1886, 53 persons were bitten by rabid dogs. One treated by a "quack" died; 26 of the remainder were treated by the Pasteur method.<sup>2</sup>

Professor Horsely says that rabies in England is known mostly in the midland counties, towns, and cities; that it is almost unknown in Scotland and Wales.<sup>3</sup> Lapland is said to be free of the disease, although the dogs were proven to be susceptible to the disease by Pasteur, who inoculated two of them.<sup>4</sup>

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<sup>1</sup> *Journal*, vol. 18, p. 91.

<sup>2</sup> *Phil. Med. Record*, vol. 32, p. 252.

<sup>3</sup> *Phil. Med. Record*, vol. 32, p. 774.

<sup>4</sup> *Philadelphia Medical Record*, vol. 30, p. 495.



The editor of the *Journal of Hygiene* calls attention to the increase of rabies since the introduction of the Pasteur Institute in Paris, and says that in one day (June 19 1888) there were 16 cases, 11 of which were from Paris.

An article in the *Journal* (vol. 32, p. 1012) calls attention to the increase of rabies in Brussels, where, late in 1898, there was almost an epidemic, owing to laxity in carrying out the restrictive measures.

Dr. Bradford, in the course of two lectures delivered at Brown University, February 13 and 20, 1900, says that there were reported to the board of agriculture, in 1892, 38 suspected cases of rabies; in 1893, 93 cases; in 1894, 248 cases; in 1895, 672 cases; in 1896, 438 cases; in 1897, 151 cases; and in 1898, 17 cases. In four years, from 1896 to 1899, he himself examined 259 suspected cases and found 138, or 53 per cent of them, to be genuine cases. He says that 264 of the 1,200 sheep in Richmond Park were affected with rabies.

Pasteur says that many islands in the Pacific Ocean are free from the disease.<sup>1</sup>

## APPENDIX C.

### Percentage of mortality in persons bitten by rabid animals who were without the Pasteur treatment.

According to Ziemsen: Bites on the face, 90 per cent; bites on the hands, 63 per cent; numerous bites on the body, 63 per cent; bites on the lower extremity, 28 per cent; bites on the upper extremity, 20 per cent. All classes of bites combined, males 60 per cent, females 40 per cent. Age, he says, has no appreciable influence.

Sir Thomas Watson says that of those bitten but few get the disease. He quotes John Hunter as saying that he knew of 21 persons being bitten, of whom but 1 died, and Hamilton as estimating the mortality as 1 to 25; and yet Watson says that a dog in 1780 bit 15 persons, of whom 3 died of hydrophobia. He also reports that in 1774, of 17 bitten 10 died; in 1817, of 23 bitten 14 died; of 11 bitten at Dijon 4 died; of 24 bitten at Rochelle 18 died; of 19 bitten at Bar Sur Ornica 12 died. This gives a total of 114 persons bitten by wolves, of whom 67 died, a mortality of over 58 per cent.

Pasteur says that 16 per cent of those bitten in France died previous to the introduction of the inoculation treatment, and that the year before this method was adopted 19 deaths from hydrophobia occurred in Paris alone.<sup>2</sup> He gives the mortality of bites on the face without treatment as 65 to 95 per cent. He cites the history he got in 1877 of 11 persons bitten by wolves, 8 of whom died, and says that the prefect of police reported in 1887 that in the department of the Seine of 306 persons treated by the Pasteur method 3 died, a mortality of .98 per cent; of 44 not treated by the Pasteur method, 7 died, a mortality of 15.90 per cent.<sup>1</sup>

According to an article in the *Journal* (vol. 33, p. 1504), there were treated at the Pasteur Institute, Athens, since it was established in 1894, 797 cases, 7 of whom died, but 5 of these died inside the limit of 15 days after the termination of treatment. Meanwhile there were 40 deaths from hydrophobia among those not applying for treatment at the institute.

In a report of the Pasteur Institute, Chicago, the mortality for bites on the face is stated to be 88 per cent; on the hands, 67 per cent; on the limbs and trunk, from 20 to 30 per cent.<sup>3</sup>

Leblanc says that the mortality was 16 per cent before the Pasteur treatment.<sup>4</sup>

<sup>1</sup> Woods's Medical and Surgical Monographs, vol. VII.

<sup>2</sup> Boston Medical and Surgical Journal, May, 1886.

<sup>3</sup> *Journal*, vol. 33, p. 303.

<sup>4</sup> Annual Report of Surgeon-General of Marine-Hospital Service, 1898, p. 283.



## APPENDIX D.

**Treatment.**

Treatment by the Pasteur method will be gone into here somewhat at length mainly for the reason that to establish its efficacy is to settle all the essential controverted points. It will prove at one and the same time the existence of the disease, both among man and animals; its specific nature and character of the virus; and it will show its wide prevalence and the existence of a sufficient number of cases to warrant every possible means for its suppression. The Pasteur method of preventive treatment has stood the test of time, and has proved to be absolutely safe and in the vast majority of cases entirely reliable. It should, however, constantly be borne in mind that it is a preventive measure only, for, the symptoms of the disease having once set in, or if the treatment is not begun in time for it to have its effect before the end of the period of incubation, it will, like all other remedies, fail.

This method, which was for the first time and successfully applied to the boy Meister in 1885, after Pasteur had succeeded in proving its efficacy upon 50 dogs, consists in injecting hypodermically into the subcutaneous cellular tissue of the abdomen for a number of consecutive days a certain amount of an emulsion or extract of the spinal cord taken from a rabid rabbit in which the disease has been artificially produced and definitely fixed by passing through a certain number of them, the spinal cord having been dried from 1 to 14 days in a jar containing caustic soda, which process caused them to lose more or less of their virulence, according to the length of time of exposure.

The following method, although it may be deviated from slightly, especially in case the bite is a very severe one or situated about the face or neck, or in case a long time has elapsed since its infliction, is that generally carried out at the Pasteur Institute in Baltimore, under the direction of Dr. Kierle, and may be taken as a type of all the rest.

Having first thoroughly disinfected the place selected for the injection, and having determined that the cord is free from pus germs by a culture test, there are given on the first day two injections of 3 cubic centimeters each of the extract of a cord that has been dried 13 or 14 days by the process already referred to; on the second day two injections of 3 cubic centimeters each of a cord 11 or 12 days dried, and so on for 21 days. From the first to the fifth day two injections are given daily; after that but one is given. For the first 4 days 3 cubic centimeters are given daily; after that 2, except on or about the ninth day, when a less quantity—say, 1.5 cubic centimeters—is given. Each day for 5 consecutive days a cord one day more potent—that is, a cord dried one day less than that of the preceding day—is used. After this time cords dried from 3 to 5 days are used on different days until the end of treatment. Cords dried but 2 days are seldom used, and those dried but 1 day never.

Besides the 8 Pasteur Institutes in France, there have been established in Russia 6, in Italy 5, in Austria 2, in New York 1, in Chicago 1, in Baltimore 1, in Habana 1, in Rio Janeiro 1, in Buenos Ayres 1, in Saragossa 1, in Malta 1, in Bucharest 1, in Constantinople 1, in Aleppo 1, in Tiflis 1, in Athens 1—making 34 in all; and although they were all founded under the supervision of the pupils of the Paris Institute, and remained under their direction until well under way, they have now become entirely independent of the mother institution.

The Pasteur Institute of Chicago gives, in the Journal for July 29, 1899, the following summary of results since the establishment of the institute: "Number of patients treated, 780, of whom only 3 died, a mortality of 0.38 per cent. Seven hundred and nine were bitten by dogs, 29 by cats, 26 by horses, 7 by skunks, 5 by wolves, 2 by cows, 1 by a calf, 1 by a rat, 1 by a mule, 1 by a pig, and 3 by hydrophobic human beings. Two hundred and sixty-eight were bitten by animals proven to be rabid either by the laboratory test or by the death of other persons or animals bitten by

the same animal. Three hundred and fifty-eight were bitten by animals recognized to be rabid by their symptoms. One hundred and sixty-one were bitten by animals strongly suspected to be rabid. Three hundred and seventy-seven persons received severe and multiple lacerated bites on the hands and wrists, 92 on the head and face, 110 on the arms, 173 on the legs and thighs, and 28 on the trunk."

The bulletin of the Pasteur Institute, New York City, gives the number of patients for the year as 241. There were treated 236 persons consecutively without a death. Of those treated, 224 were bitten by dogs, 13 by cats, and 3 by human beings. From the founding of the institute, in February, 1890, to January, 1897, there were treated 962 persons, of whom 12 died, a mortality of 1.24 per cent. The editor of the bulletin says that if those who died within 15 days after the termination of the treatment are excluded, which is the European practice, there would be but 5 deaths, a mortality of 0.52 per cent.

The bulletin of the Pasteur Institute of Paris for 1897 gives the statistics of the Pasteur Institute of Tiflis for the year 1896 as follows: "Cases remaining over from the previous year, 12; new cases, 230—making a total of 242 treated. Of these, 33 were efficiently cauterized, 152 inefficiently, and 57 not at all. One hundred and ninety-three were bitten by dogs, 6 by horses, 2 by cats, 1 by a wolf, and 1 by an ass. Fifty of the cases occurred in the spring, 85 in summer, 55 in autumn, and 9 in winter. There were 3 deaths, but of 1 which occurred 15 days after treatment, a mortality of 0.41 per cent."

The following is a summary of the report of the Pasteur Institute at Rio de Janeiro, Brazil, from its foundation until June 30, 1898. There applied for treatment 4,068 persons. In 1,373 cases treatment was refused; in 3 because symptoms had already appeared, and in the others because it was discovered that they were not bitten by rabid animals. In 2 of the rejected cases symptoms afterwards appeared. Two thousand three hundred and eighty-three were bitten by dogs, 287 by cats, 2 by mules, 1 by a cow, 2 by asses, 1 by a horse, 4 by monkeys; 3 had contaminated sores, and 10 had been accidentally inoculated in the institution. Ninety-nine did not wait for the termination of the treatment, and of them 3 were taken with hydrophobia after leaving. Five died of other diseases during treatment, and in 6 hydrophobia made its appearance before the termination of treatment. Of the 2,585 receiving full treatment, 20 died—9 within 15 days after termination of treatment—a mortality of 0.77 per cent. One thousand nine hundred and thirty-five had been bitten on exposed parts. One thousand five hundred and forty-five were residents of Rio de Janeiro, the remainder coming from different parts of Brazil.

The report of the Pasteur Institute of Baltimore for the year 1897 shows number of cases as 35, without a death. Twenty-five of the patients were bitten by dogs proved to be rabid.<sup>1</sup>

A report of the Pasteur Institute of Paris for the year 1895 gives the total number treated as 1,520, with 2 deaths, a mortality of 0.13 per cent, the lowest of any year up to that time. In the completed report up to 1898 the deaths for the year 1895 are reported as 5 instead of 2. This would seem to indicate that in this latter report those who died before the lapse of 15 days after the completion of the treatment have been included.

The report of the Pasteur Institute, Algiers, March, 1900, shows that there were treated in the department of Algiers 645 cases; in the department of Constantin, 557 cases; in the department of Oran, 632; and in that of Tunis, 2, thus making 1,836 cases, in 9 of which the patients died, a mortality of 0.49 per cent.

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<sup>1</sup> Journal, vol. 30, p. 1175.

The following is the report issued by the Pasteur Institute of Paris, and is complete up to the end of the year 1898:

Year.	Treated.	Died.	Mortality.
			<i>Per cent.</i>
1886.....	2,671	25	0.94
1887.....	1,770	14	.79
1888.....	1,622	9	.55
1889.....	1,830	7	.38
1890.....	1,540	5	.32
1891.....	1,559	4	.25
1892.....	1,790	4	.22
1893.....	1,648	6	.36
1894.....	1,387	7	.50
1895.....	1,520	5	.33
1896.....	1,308	4	.30
1897.....	1,521	6	.39
1898.....	1,465	3	.20

This gives a total of 21,631 treated during the 13 years.

## APPENDIX E.

### The muzzle a means of prevention.

[Extract from a paper read by Fleming before the Seventh International Congress of Hygiene and Demography, London, August 10-17, 1891.]

Rabies being transmitted, as a rule, by the bites of dogs, and, as in any case in which the disease prevails there can be no certainty when a dog is not infected, if it at all times be prevented from inflicting wounds by its teeth, it is evident that the danger of extension of the malady must be reduced at least to a minimum. Dogs can be hindered from biting by causing them to wear a properly constructed muzzle, and if it fits well it should cause very little, if any, inconvenience to them.

Rabid dogs sometimes escape from home without their muzzles, and the absence of these is an indication that they should be seized; and wandering and ownerless dogs are also known by their not wearing muzzles, and can therefore be secured by the police.

The value of the muzzle in suppressing rabies has been demonstrated on many occasions, and in serious outbreaks of the disease its introduction has always coincided with a diminution in the number of cases, and the eventual extinction of the scourge. Its use is always coincident with a decrease in the number of cases of hydrophobia occurring among people during such outbreaks, and their ultimate cessation. The evidence in support of this statement is so voluminous and explicit that anyone examining it must be convinced as to the certainty of the fact. Two or three instances may be cited.

In the report of the royal commission on rabies, it is stated that "in the city of Berlin special regulations are in force. In consequence of a severe outbreak in the year 1852, during which 107 dogs were destroyed as rabid, the royal police issued a decree to the effect, on July 2, 1853, that all dogs should be provided with a wire muzzle, positively preventing the animal from biting, and to empower special persons, appointed by the police for that purpose, to seize and destroy all dogs not so muzzled and, when the owner could be found impose a fine of 10 thalers (11.10s.) or a term of imprisonment. In the year following this decree only 1 dog was killed as rabid, against 97 in the previous year. The decree still remains in force, but does not seem to have been effectual in preventing the recurrence of epidemics of rabies;



for the number of dogs killed as rabid, which up to 1863 had not exceeded 9 in any year, rose progressively in the succeeding years, until in 1868 the number had reached 66, declining again to 7 in 1870, only to increase in 1872 to 69. In 1875 a law was passed, extending to the whole of Prussia, for the suppression and prevention of animal disease which provides that all dogs suspected of rabies shall be immediately killed, as also all animals which it is evident have been bitten by rabid animals; and that all dogs in a district which has been infected by an outbreak of rabies shall be confined, or, when abroad, both muzzled and led. The technical section of the veterinary board in Berlin are of opinion that the passing of this law, and not alone the existence of the muzzling order in that city, is the cause of the extinction of rabies in Berlin. No case has occurred there since 1883."

In Vienna we are informed that rabies was entirely suppressed by 18 months of stringent muzzling; but in the summer of 1886 the muzzling order was rescinded, and badges had to be worn on dogs' collars instead. In the following half year there was only one case of the disease, but in the next half year rabies became epidemic, and the muzzle had again to be worn, with the result that the malady soon subsided and disappeared. Consequently the muzzling order is still rigidly and most beneficially enforced in Vienna.

In Holland, before 1875, rabies was prevalent to a very serious extent; but in June of that year the use of the muzzle was ordered, with the result that in the autumn the number of cases fell to 41; in the next whole year there were 55 cases; in 1877 there were 14; in 1878 there were 4, and in 1879 there were 3. These, and the cases which have since been reported, occurred only on or near the frontier of Belgium, in which country the muzzle is not in use, though rabies is always prevalent. To such a degree, indeed, does the disease exist in Belgium that in 1889 there were brought to the veterinary school at Brussels no fewer than 94 really rabid dogs, 49 having been admitted during the winter quarter, and 45 during the summer quarter; and from January 1 to April 24, 1890, 16 were taken there.

In the Grand Duchy of Baden during the years 1871, 1872, 1873, 1874, and 1875 the number of cases of rabies was, respectively, 18, 37, 37, 50, and 43. Then the muzzle was rigorously applied, and in 1876 there were 28 cases; in 1877, 3; in 1878, 4; in 1879, 2; in 1880, 2; in 1881, 2; in 1882, 3; in 1883, 2, and in 1884, 2. Since that year only 1 case has been observed, and that was a dog from Metz, where there were no proper regulations, which had been contaminated before its arrival at Baden.

In Sweden rabies was at one time a somewhat common disease, and from 8 to 10 people died annually of hydrophobia; but (muzzling being enforced and the importation of dogs prevented) rabies has been unknown for many years, and no deaths from hydrophobia have occurred since 1870.

In England the value of the muzzle has been as well exemplified as elsewhere, though its application has always been extremely partial, being only employed in towns or districts when rabies has increased to such an extent as to create alarm and removed immediately when the disease had for the time disappeared. No effective action has at any time been taken to suppress rabies in England or Ireland. In the latter country it is always more or less prevalent, and ever since it was first legislated for in England it has maintained a permanent existence in the following fourteen counties, viz, Chester, Derby, Essex, Hants, Kent, Lancaster, London, Middlesex, Notts, Surrey, Sussex (East), Sussex (West), Warwick, and York (W. R.). During the year 1890-91 cases of rabies were reported for the first time in three counties previously free from it; these were Bucks, Norfolk, and York (E. R.); and it was reintroduced into Leicester after an absence of two years, and into Stafford, which had been free for one year.

The extent to which rabies has prevailed in this country may be judged from the loss of human life through bites from rabid dogs. It is stated that in England (including Wales) there have been 939 deaths from hydrophobia recorded during



the past 38 years, the yearly average for the first 16 years being 8, for the next 16 years 15, and for the remaining period, ended in 1885, 45. Thus the mortality has steadily advanced through more than 400 per cent. On the other hand, the Prussian preventive measures have reduced deaths from hydrophobia to a remarkable degree, for while in the decade ended in 1819 there was a yearly average of 166 deaths, in a similar period ended in 1886, there was a yearly average of 4½.

The value of the muzzle in suppressing rabies has been perhaps best demonstrated in London on several occasions, and especially in 1885. In the previous years hydrophobia had increased to a very alarming extent, as has just been mentioned, in England, and no steps worthy of note had been taken to check the mortality. For London alone in that year no fewer than 27 deaths were reported as due to the bites of rabid dogs. A muzzling order was then enforced, and at the end of 1886 not a death was recorded. Unfortunately the order prescribing the use of the muzzle was then rescinded, and in a few months a case of hydrophobia occurred in the south of London, soon to be followed by others, and in 1889 10 deaths were registered. In July of that year the muzzling order was again issued and stringently carried out, and rabies and hydrophobia once more disappeared.

In other countries where rabies prevails and dogs are not muzzled, though other measures, as the dog tax, medal on the collar, leading by a leash, etc., are enacted, the malady continuously manifests itself, and numbers of people perish from hydrophobia every year. We may give Belgium and France as examples. In the latter country the monthly sanitary bulletin shows to what an extent it is prevalent, and I need only to refer to the last two which I have to hand—those for March and April of the year 1891. In March 132 dogs and 8 cats were destroyed as rabid, besides those sacrificed as a preventive measure, while 32 persons, as well as cattle and pigs, were bitten by mad dogs. In April 151 dogs and 4 cats were destroyed because of being rabid, and a large number were killed because they had been bitten by mad dogs or were wanderers, and 47 persons were wounded by mad dogs. The reports of the Pasteur Institute show that by far the largest proportion of persons protectively inoculated are French. There can be no doubt that if the use of the muzzle were enforced generally and strictly throughout France rabies would quickly vanish from the sanitary bulletins.

Belgium has tried all other recognized measures except the muzzle, and yet the malady is as rife and deadly as ever in that country. A royal commission was recently appointed to inquire into the subject, and the report addressed to the Superior Council of Hygiene in April last states that the regulations in force are insufficient, and while not testing the value of Pasteur's preventive inoculations with regard to people bitten by rabid dogs, it is urged that there is something far more desirable, and that is the extinction of the disease in the canine species. For this object the commission insists upon the immediate adoption of the muzzle.

Senseless sentimentality has opposed the use of this article in a most extraordinary manner in this country, and one would be inclined to believe that there are people who care less for human suffering and human life than for a little inconvenience or discomfort to dogs. A well-fitting muzzle should cause very trivial inconvenience and discomfort, while insuring absolute safety from dog bite. Repeatedly rabid dogs have been brought to veterinary surgeons wearing muzzles, and so rendered safe, as it is a well-known fact that a diseased dog will, in nearly every instance, allow those it knows to handle it and put on a muzzle. A leash only is no protection, for the dog can bite and is as dangerous as if not led. Frequently rabid dogs on the leash are brought to veterinary surgeons. It is also perfectly obvious that a collar, no matter how embellished and bemedaled it may be, will no more prevent rabies or hinder dogs from biting than will a linen collar on a man's neck preserve him from smallpox or influenza. But we need not stay to notice these ridiculous notions.

## APPENDIX F.

AN ACT to create a revenue in the District of Columbia by levying a tax upon all dogs therein, to make such dogs personal property, and for other purposes.

[1 Sup. R. S., 374.]

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That there shall be levied a tax of two dollars each per annum upon all dogs owned or kept in the District of Columbia; said tax to be collected as other taxes in said District are or may be collected.

SEC. 2. It shall be the duty of the collector of taxes, upon receipt of said tax, to give to the person paying the same, for each dog so paid for, a suitable metallic tag, stamped with the year, showing that said tax has been duly paid; and he shall keep a record of all such payments, with the date thereof, and the name, color, and sex of such dog, and the name of the person claiming any dog so paid for; and a copy of such record, certified under the hand and official seal of the said collector, which shall be given to any person demanding the same, upon payment of twenty-five cents therefor, shall be prima facie evidence of such payment in any court in the District of Columbia.

SEC. 3. The poundmaster of the District of Columbia shall, during the entire year, seize all dogs found running at large without the tax tag, issued by the collector aforesaid, attached, and shall impound the same; and if, within forty-eight hours, the same are not redeemed, by the owners thereof, by the payment of two dollars, they shall be sold or destroyed, as the poundmaster may deem advisable; and any sale made by virtue hereof shall be deemed valid to all intents and purposes in all the courts of the District of Columbia.

SEC. 4. Any dog wearing the tax tag hereinbefore provided for shall be permitted to run at large in the District of Columbia, and shall be regarded as personal property in all the courts of said District; and any person injuring or destroying the same shall be liable to a civil action for damages, which, upon proof of said injuring or killing may be awarded in a sum equal to the value usually put upon such property by persons buying and selling the same, subject to such modification as the particular circumstances of the case may make proper.

SEC. 5. Any person owning any dog so recorded in the collector's office shall be liable in a civil action for any damage done by said dog to the full amount of the injury inflicted.

SEC. 6. It shall be the duty of any person owning or possessing a dog to place, or cause to be placed and kept, around the neck of such dog, a collar, on which shall be marked and engraved, in legible and durable characters, the name of the owner or possessor, and the letters "D. C.," and to which collar must be attached the insignia or tax tag furnished by the District tax collector, in accordance with the first and second sections of this law, under the penalty of not less than five nor more than ten dollars; and if any person shall put, or cause to be put, a collar, with the insignia or tax tag, around the neck of any dog owned or possessed by any person or persons residing in the District, without having obtained a license for keeping such animal, he, she, or they shall forfeit and pay the sum of not less than five nor more than ten dollars for each and every offense.

SEC. 7. Whenever it shall be made to appear to the Commissioners that there are good reasons for believing that any dog or dogs within the District are mad, it shall be the duty of the Commissioners to issue a proclamation requiring that all dogs shall, for a period to be defined in the proclamation, wear good, substantial muzzles securely put on, so as to prevent them from biting or snapping; and any dog going at large during the period defined by the Commissioners without such a muzzle shall be taken by the poundmaster and impounded, subject to the provisions of section three.

SEC. 8. Any person who shall remove, or cause to be removed, the collar and insignia or tax tag from the neck of any dog, or entice any properly licensed dog into any inclosure for the purpose of taking off its collar or insignia, or shall for such purpose decoy or entice any animal out of the inclosure or house of its owner or possessor, or shall sieze or molest any dog while held or led by any person, or shall bring any dog into the District for the purpose of taking up and killing the same, shall forfeit and pay a sum of not more than twenty dollars.

SEC. 9. If any owner or possessor of a fierce or dangerous dog permit the same to go at large in the District of Columbia, to the danger or annoyance of the inhabitants, he shall forfeit and pay, for the first offense, ten dollars; for the second, a sum not exceeding twenty dollars; and upon a third conviction for the same offense, the Commissioners shall immediately cause the dog, upon account of which the conviction takes place, to be slain and buried.

SEC. 10. That all acts or parts of acts now in force in the District of Columbia inconsistent with the provisions of this act be, and the same are hereby, repealed.

Approved June 19, 1878.

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Extract from An Act for the establishment of the Bureau of Animal Industry.

[1 Sup. R. S., 2d Ed., 437.]

SEC. 8. That whenever any contagious, infectious, or communicable disease affecting domestic animals, and especially the disease known as pleuro-pneumonia, shall be brought into or shall break out in the District of Columbia, it shall be the duty of the Commissioners of said District to take measures to suppress the same promptly and to prevent the same from spreading; and for this purpose the said Commissioners are hereby empowered to order and require that any premises, farm, or farms where such disease exists, or has existed, be put in quarantine; to order all or any animals coming into the District to be detained at any place or places for the purpose of inspection and examination; to prescribe regulations for and to require the destruction of animals affected with contagious, infectious, or communicable disease, and for the proper disposition of their hides and carcasses; to prescribe regulations for disinfection, and such other regulations as they may deem necessary to prevent infection or contagion being communicated, and shall report to the Commissioner of Agriculture whatever they may do in pursuance of the provisions of this section.

Approved May 29, 1884.





U. S. DEPARTMENT OF AGRICULTURE,  
BUREAU OF ANIMAL INDUSTRY.

D. E. SALMON, D. V. M., Chief.

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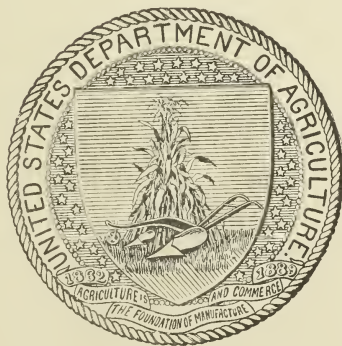
NATIONAL AND STATE DAIRY LAWS.

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COMPILED AND ABSTRACTED

BY

R. A. PEARSON, M. S.,  
ASSISTANT CHIEF OF DAIRY DIVISION.



WASHINGTON:  
GOVERNMENT PRINTING OFFICE.  
1900.

## LETTER OF TRANSMITTAL.

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U. S. DEPARTMENT OF AGRICULTURE,  
BUREAU OF ANIMAL INDUSTRY,  
*Washington, D. C., November 21, 1900.*

SIR: I have the honor to transmit herewith, and recommend for publication as a bulletin of this Bureau, a manuscript entitled "National and State Dairy Laws," prepared by Mr. R. A. Pearson, assistant chief of the Dairy Division. This manuscript contains brief abstracts of all National and State dairy laws now in force and the full texts of those which have been enacted since 1898. The laws then in force were published in the Fourteenth Annual Report of this Bureau. There has been considerable dairy legislation during the past few years, and in this connection numerous requests for information as to the laws of the various States have been received. This bulletin will assist in answering such inquiries, and will be especially useful in States where it is proposed to enact new dairy laws during the coming session of the legislatures.

Respectfully,

D. E. SALMON,  
*Chief of Bureau.*

Hon. JAMES WILSON,  
*Secretary.*

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# NATIONAL AND STATE DAIRY LAWS.

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## INTRODUCTION.

Abstracts and full texts of all national and State laws applying to dairy products and their imitations were published in 1898 in the Fourteenth Annual Report of the Bureau of Animal Industry, and later reprinted in separate form. The call for such information was much larger than had been anticipated and necessitated a second reprint. Since that compilation was made there has been considerable new legislation on the subject, and this has required replying to many inquiries by letters to supplement the printed volume. It now seems advisable to show all the changes that have been made and the new laws that have been enacted.

In the last two years new dairy laws have been passed in twenty States, the most common subject of legislation being renovated butter, the manufacture of which has rapidly increased; it is customary to permit it if plainly labeled. In some States the dairy laws have been repealed and reenacted with slight changes, and it would be well if the same were done in some other States where the laws are unnecessarily numerous and bulky. Only a few laws or parts of laws have been repealed by name. Usually new laws "repeal all acts or parts of acts in conflict," and this often leaves the compiler in doubt as to whether an old law is still operative or not; in some cases it might require a court decision to determine the point. When there is doubt as to whether or not a law is in force, it is printed in full.

It is believed this compilation is complete, though some laws of a general nature referring indirectly to dairy products may have been overlooked and omitted. In each case the names of the acts have been referred to the State officer especially charged with their enforcement or, where there is no such officer, to the secretary of state, with request that any omissions or corrections be noted. It has been chosen to include some laws which refer but remotely to dairying rather than risk omitting any that might be of interest in this connection.

As in the 1898 compilation the table and abstracts are arranged in the following order: State dairy officials, milk, butter, cheese, imitation butter, imitation cheese, miscellaneous, pure food. It is obviously impossible to arrange the full laws in the same way. As the laws which were printed in 1898 are given here by reference only it is an easy matter to find and examine the latest dairy legislation.

It is hoped this revised compilation and the abstracts will be useful where new dairy laws are needed, as well as where those now on the statute books are not as generally known as they should be; also that it will emphasize the need of clearer legislation in some States where it is evident that the dairy interests have not been protected as was apparently intended by those who passed the laws now in force.

# PRINCIPAL SUBJECTS ON WHICH DAIRY LAWS HAVE

[Numbers in the first column show the pages of this bulletin where brief abstracts of the laws full on the subjects named at the heads of the columns. The plain figures refer to pages in bulletin. D.=Defined only. P.=Must be colored pink. A plus mark (+) following a page

States, etc.	Page of abstract.	State dairy commis- sioner or similar officer.	Milk.					Butter.		Cheese.		
			Standard pre- scribed.	Skim milk reg- ulated.	Condensed milk regulated.	Impure milk re- stricted.	Other milk laws.	Defined or standard fixed.	Other butter laws.	Defined, stand- ard prescrib- ed or grades established.	Registered brands pro- vided.	Other cheese laws.
United States .....	9						563+	D. 556	563	D. 560		563
Alabama .....	10											
Arizona .....	10											
Arkansas .....	10							D. 564				
California .....	10	{ 568 39 }				38+			564	565	564	
Colorado .....	11	568								569	569	
Connecticut .....	11	{ 571+ 41 }		572		572+			573			
Delaware .....	12											
District of Columbia .....	12		580	577+		577+	{ 576+ 578 }					
Florida .....	12											
Georgia .....	13		581	581		581						
Idaho .....	13											
Illinois <sup>1</sup> .....	13	43+ 43	583+	588	583+	584						
Indiana <sup>2</sup> .....	14	47	589		589				589			589
Iowa .....	15	589+	592		592	591						592
Kansas .....	15			593		593						
Kentucky .....	16			594		594						
Louisiana .....	16								50			50
Maine .....	16		596	596		596+		D. 598		D. 598		
Maryland .....	17						51+					
Massachusetts .....	17	601+ 54	603+	605	603	54	D. 606			D. 606		
Michigan .....	18	{ 608+ 55+ }	615	615		{ 613+ 56 }		D. 58	613		612	613
Minnesota .....	19	{ 623 59+ }	60	{ 60 62 }		{ 60+ 64+ }	623		{ 61 63+ }	62+	62	{ 61 63+ }
Mississippi .....	20											
Missouri .....	20									D. 625		624+
Montana .....	21											
Nebraska .....	21	67+	{ 628, 631 }		628	631			{ 628 63+ }			{ 628 68+ }
Nevada .....	22		632		632							
New Hampshire .....	22	635	634		635	634	D. 635			D. 635		
New Jersey .....	23	{ 639, 644+ }	37	{ 637 640 }		{ 636+ 640 }		D. 643	642	D. 643		642
New Mexico .....	23											
New York .....	24	{ 652+ 72+ }	654	655	655+	654+	{ 655, 657 }	D. 654	{ 657 74 }	D. 654	{ 657 74 }	{ 657 74 }
North Carolina .....	25							D. 658				
North Dakota .....	25	77+	79		79	78+			78		78	78+
Ohio .....	26	661+	663	{ 663, 665 }	665	{ 663, 665 }		666		D. 666	668	{ 664, 667 }
Oklahoma .....	27				670							
Oregon .....	27	82+ 83		83	84			83	84	83		84
Pennsylvania .....	28	{ 673+ 86+ }	675	675+		375+	674+			678	678	
Rhode Island .....	29		682	682		682	{ 681 89 }		680			
South Carolina .....	30		683	683		683						
South Dakota .....	30							D. 684		D. 684		
Tennessee .....	30											
Texas .....	31											
Utah .....	31	93+		91		91	91+		91+			91+
Vermont .....	31		689+	689		{ 689, 691 }	689	D. 690	{ 690 95+ }			{ 690 96 }
Virginia .....	32			691		691			691			692
Washington .....	33	{ 100+ 104+ }	99	103		99	{ 100 102 }		{ 100 103 }	99	99	99
West Virginia .....	34											
Wisconsin .....	34	105+	107			106+			109		{ 106, 108 }	{ 107 109 }
Wyoming .....	35						109					
Canada .....	35			704		704+			706+		705+	705+

<sup>1</sup> See footnote, page 45.

<sup>2</sup> See footnote, page 48.



## STATE STANDARDS FOR DAIRY PRODUCTS.

Standards for the composition of dairy products have been established in several States and are (in June, 1900) as follows:

States.	Milk.			Skim milk.	Cream.	Butter.	Cheese.
	Total solids.	Solids not fat.	Fat.	Total solids.	Fat.	Fat.	Fat.
California.....	<i>Per cent.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per cent.</i>	Full cream, 30 p. ct. fat. Half skim, 15 p. ct. fat. Skim, from skim milk. (Fancy cheese excepted.)
Colorado.....							35 p. ct. total solids to be fat.
District of Columbia.....		9	3.5	9.3	20	83	
Georgia.....		8.5	3.5			Not over 12 per ct. water or 5 p. c. salt	
Illinois <sup>1</sup> .....	12		3		<sup>2</sup> 15	80	48 p. ct. total solids, fat.
Indiana.....		9	3			80	10 p. ct. milk fats.
Iowa.....	12.5		3		15	Not over 15 per ct. water or 6 p. c. salt	
Maine.....	12		3				
Massachusetts.....	13	9.3	3.7	9.3			
April-September	12	9	3				
Michigan.....	12.5		3				
	Sp. grav. 1.029-33			sp. grav. 1.032-37			
Minnesota.....	13		3.5		20		45 p. ct. total solids to be fat.
Missouri.....							From milk testing at least 3 p. ct. fat.
New Hampshire.....	13						
New Jersey.....	12						
New York <sup>3</sup> .....	12		3				Skim, from skim milk.
North Dakota.....	12		3		15		Skim, from skim milk.
Ohio <sup>3</sup> .....	12		3			80	20 p. ct. fat.
May and June ..	11.5						
Oregon <sup>3</sup> .....	12	8	3	sp. grav. 1.038	20	Not over 14 per ct. water.	
Pennsylvania.....	12.5		3	2.5 p. c. fat.			Full cream, 32 p. ct. fat.
(Milk and skim-milk standards refer to cities of 2d and 3d class.)	Sp. grav. 1.029-33			6 per ct. cream by vol.			Three-fourths cream, 24 p. ct. fat.
				sp. grav. 1.032-37			One-half cream, 16 p. ct. fat.
							One-fourth cream, 8 p. ct. fat.
							Skim, below 8 p. ct. fat.
							(Fancy cheese weighing less than 5 pounds excepted.)
Rhode Island.....	12		2.5				
South Carolina.....		8.5	3				
Utah.....				9 per ct. solids not fat.			Skim, size regulated.
Vermont.....	12.5	9.25		<sup>4</sup> 4			
May and June ..	12						
Washington.....		8	3		18		Full cream, 30 p. ct. fat. Skim, 15 per ct. fat. (Fancy cheese excepted.)
Wisconsin.....			3				Skim, size regulated.

<sup>1</sup> Condensed milk shall be made from milk containing at least the legal standard of 3 per cent butter fat and evaporated to one-third or less of its original volume.

<sup>2</sup> Coffee cream shall contain at least 15 per cent of fat, and whipping cream 22 per cent fat.

<sup>3</sup> Milk solids of condensed milk shall be in quantity the equivalent of 12 per cent of milk solids in crude milk, of which solids 25 per cent shall be fat.

<sup>4</sup> As basis for payment at factories.



## ABSTRACTS OF DAIRY LAWS.

In the following abstracts it is aimed to state briefly the principal features of all the national and State laws now (June, 1900) in force which apply to dairy products or their imitations, omitting matters of minor interest, as references to penalties, details of enforcement, disposition of fines, etc.

States having dairy commissioners or other officers specially charged with the enforcement of dairy laws usually give such officers necessary authority for securing evidence, having analyses made, and conducting prosecutions; it is also customary to allow them necessary traveling expenses in addition to the regular salary.

When a subject is followed by the words "No law," it should be understood there is no *special* law on that subject. It may, however, be covered by a pure-food or other law, an abstract of which is given under another heading.

### UNITED STATES.

**Milk.** Import duty on fresh milk, 2 cents per gallon. *Condensed milk.*—Import duty on preserved, condensed, or sterilized milk, 2 cents per pound.

**Butter.** Butter is defined as the food product usually known as butter and made exclusively from milk or cream, with or without salt or color. Import duty, 6 cents per pound.

**Cheese.** Cheese is defined as the food product known as cheese and made exclusively from milk or cream, with or without coloring matter. Import duty, 6 cents per pound.

**Oleomargarine and filled cheese.** Each original package of oleomargarine or filled cheese must bear a prescribed label. Regulations concerning reports, etc., of manufacturers and branding of all packages not provided for by the law are made by the Commissioner of Internal Revenue. *Oleomargarine.*<sup>1</sup>—Oleomargarine is defined as certain (enumerated) manufactured substances, extracts, mixtures, and compounds, including such mixtures and compounds with butter, made in imitation of butter and intended to be sold for butter. Taxed 2 cents per pound (except that for export, which is not taxed). Import duty, 6 cents, and internal revenue tax on imported oleomargarine, 15 cents per pound. Manufacturers, wholesale dealers, and retail dealers are defined and taxed, respectively, \$600, \$480, and \$48. *Filled cheese.*—Filled cheese is defined as all substances made from milk or skimmed milk with admixture of butter, oils, or compounds foreign to such milk, and made in imitation of cheese. Taxed 1 cent per pound. Import duty, 6 cents, and internal revenue tax on imported filled cheese, 8 cents per pound. Original packages shall be plainly branded "Filled cheese," and signs must be displayed where sales are made. Manufacturers, wholesale dealers, and retail dealers are defined and taxed, respectively, \$400, \$250, and \$12.

**Miscellaneous.** Import duty on sugar of milk, 5 cents per pound.

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<sup>1</sup> See footnote, page 37.

## ALABAMA.

Milk. (No law.)

Butter. (No law.)

Cheese. (No law.)

Imitation butter. No article which is in imitation of pure yellow butter and is not made wholly from pure milk and cream shall be manufactured, nor sold, nor used in any public eating place, hospital, or penal institution, etc.; but oleomargarine, free from color or other ingredient to cause it to look like butter, and made in such a manner as will advise the consumer of its real character, is permitted; it must be stamped with its name.

Imitation cheese. (No law.)

Miscellaneous. (No law.)

## ARIZONA.

(No dairy laws.)

## ARKANSAS.

Milk. (No law.)

Butter. Butter is defined as a product manufactured exclusively from milk and cream.

Cheese. (No law.)

Imitation butter. Substitutes for butter, whether in wholesale or retail packages, shall be plainly labeled "Adulterated butter," "Oleomargarine," or such other names as shall properly describe them. In hotels, etc., dishes containing said articles must be plainly marked in same manner.

Imitation cheese. (No law.)

Miscellaneous. (No law.)

## CALIFORNIA.

Dairy bureau. Three resident citizens, experienced in the manufacture of dairy produce, constitute a State dairy bureau. Period of office, four years; no compensation. Has charge of inspection of live stock and the investigation of dairies and creameries for unsanitary conditions; shall include statistical matter in annual report. Their agent receives \$1,800 salary and is allowed as many as twenty assistants, at not over \$4 per day, and chemists when necessary. Appropriation for bureau, \$7,500 for fifty-first fiscal year and \$5,000 for fifty-second fiscal year.

Milk. The sale of milk which is impure or the product of diseased cows is forbidden.

Butter. Roll butter when sold must be full weight.

Cheese. All cheese must be branded, with brands procured from and recorded at dairy bureau, "California full-cream cheese," if it is made from pure whole milk and contains at least 30 per cent fat; "California half-skim cheese," if made from pure milk and has at least 15 per cent fat; "California skim cheese," if made from pure skim milk. Fancy cheeses are excepted.

Imitation butter and cheese. Imitation butter and cheese is defined as any article produced from pure milk or cream, salt, rennet, and harmless coloring matter, which is in semblance of butter or cheese and designed as a substitute for such. Shall not be colored to imitate butter or cheese, and must be in such form as will advise consumer of its real character. Every package must be plainly marked "Substitute for butter," or "Substitute for cheese," and accompanied by a statement giving name of manufacturer, ingredients, etc.,

a copy of which must be given to each purchaser, with verbal notice at the time of sale, in connection with which words like "creamery," "dairy," etc., are prohibited. Patrons of eating places shall be notified if substitutes of butter or cheese are used. Prohibited in State charitable institutions. *Process, or renovated, butter.*—Butter made from stale, rancid, or decomposed butter shall be plainly labeled "Process butter" or "Renovated butter."

**Miscellaneous.** State veterinarian may order slaughter of diseased animals at expense of owners.

County district attorneys shall prosecute offenders.

## COLORADO.

**Dairy commissioner.** The dairy commissioner, appointed by the governor, shall be a practical dairyman; period of office, two years; salary, \$1,200. May employ a deputy at salary of \$1,000 per year and a chemist<sup>1</sup> at \$10 per day. State appropriation \$2,000 per annum for 1895 and 1896.

**Milk.** (No law.)

**Butter.** (No law.)

**Cheese.** All cheese must be branded, with brands procured from the dairy commissioner, "Colorado full-cream cheese," if not less than 35 per cent of total solids consists of butter fat; all containing less than this amount of fat, "Skim cheese."

**Imitation butter and cheese.** All articles not produced from pure milk or cream, in imitation of pure cheese or yellow butter, are prohibited; but oleomargarine and filled cheese are permitted if free from color or other ingredient to cause them to look like butter or cheese. They must be made in such form and sold in such manner as will advise the consumer of their real character. *Imitation cheese.*—Cheese containing any foreign fats, oleaginous substances, rancid butter, etc., shall be branded "Imitation cheese."

**Miscellaneous.** (No law.)

## CONNECTICUT.

**Dairy commissioner.** The dairy commissioner is appointed by the governor; period of office, two years; salary, \$1,500 per year. He may appoint a deputy at salary of \$1,200 per year. (Office expenses limited to \$1,000 per year.<sup>2</sup>) Two thousand five hundred dollars annually appropriated to the Connecticut Agricultural Experiment Station to carry out the provisions of the pure-food act.

**Milk.** Connecticut Agricultural Experiment Station may fix standard. *Skimmed milk.*—Skimmed milk must be plainly labeled. *Adulterated milk.*—The sale or delivery of adulterated, tainted, or diseased milk to a butter or cheese factory is prohibited.

**Butter.** Tub butter in prints, pats, etc., must be labeled "Tub butter."

**Cheese.** (No law.)

**Imitation butter.** Imitation butter, defined as any article resembling butter in appearance and not made wholly, salt and coloring matter excepted, from cow's milk, is prohibited; but oleomargarine or imitation butter, free from color or other ingredient to cause it to look like butter, and made in such form and sold in such manner as will advise consumer of its real character, is permitted. Words like "butter," "dairy," etc., shall not form a part of its name or appear on its package. Imitation butter shall be sold only in labeled packages, or registered places which display signs provided by the dairy commissioner, and purchasers

<sup>1</sup> See footnote, page 40.

<sup>2</sup> See footnote, page 41.

shall be informed orally of the character of the article at the time of sale. Use of imitation butter in public eating places, bakeries, etc., must be made known by signs.

Imitation cheese. (No law.)

Miscellaneous. (No law.)

**Pure food.** Any article of food or drink is deemed adulterated if any inferior or injurious substance has been added to it, if any valuable constituent has been removed, if it is an imitation of or sold as another article, if it is colored to conceal inferiority, if it contains any preservative not known to the purchaser, if it is decomposed or diseased, or the product of a diseased animal, etc. With certain exceptions, such articles are prohibited.

#### DELAWARE.

Milk. (No law.)

Butter. (No law.)

Cheese. (No law.)

**Imitation butter and cheese.** The manufacture or sale of any article not produced from unadulterated milk or cream, which is in imitation of pure yellow butter or designed to take the place of pure cheese, is prohibited; but oleomargarine is permitted if in a distinct form, free from butter color, and sold in such manner as to show its real character. It shall be plainly marked "Oleomargarine."

Miscellaneous. (No law.)

#### DISTRICT OF COLUMBIA.

**Milk.** Milk standard, 9 per cent solids not fat,  $3\frac{1}{2}$  per cent fat. Permit to sell milk must be obtained from health officer, who issues regulations for the government of dairies and the sale of milk. *Skimmed milk.*—Skim-milk standard, 9.3 per cent total solids. Must be plainly marked "Skim milk." *Adulterated milk.*—Diseased and unwholesome milk is prohibited. *Cream.*—Cream standard, 20 per cent fat.

**Butter and cheese.** Butter and cheese shall be made exclusively of milk or cream, with or without common salt. *Butter.*—Butter standard, 83 per cent fat and not more than 12 per cent water or 5 per cent salt.

**Imitation butter and cheese.** Substances in semblance of butter or cheese, not made exclusively of milk or cream, but with the addition of melted butter to take the place of cream, or any oil, shall be plainly branded on each package "Oleomargarine," and a label, similarly printed, must accompany each retail sale.

Miscellaneous. (No law.)

**Pure food.** Any food or drink is deemed adulterated if any inferior or injurious substance has been mixed with it, if any valuable constituent has been removed, if it is an imitation of or sold as another article, if it is decomposed or diseased, if it is colored to conceal inferiority, etc. With certain exceptions, which shall be made known to the purchaser, such articles are prohibited.

#### FLORIDA.

Milk. (No law.)

Butter. (No law.)

Cheese. (No law.)

**Imitation butter.** The sale of any spurious preparation, purporting to be butter, is prohibited. Guests at hotels, etc., must be notified if oleomargarine or other spurious butter is used.



Imitation cheese. (No law.)

Miscellaneous. (No law.)

**Pure food.** The sale of any unwholesome provisions without knowledge of the buyer and the adulteration of any food with substance injurious to health are misdemeanors.

## GEORGIA.

**Milk.** Milk standard,  $3\frac{1}{2}$  per cent fat,  $8\frac{1}{2}$  per cent solids not fat. *Skimmed milk.*—Skimmed milk is defined as milk below the standard. *Adulterated milk.*—The sale of adulterated, impure, or diseased milk is prohibited.

**Butter.** (No law.)

**Cheese.** (No law.)

**Imitation butter and cheese.** Imitation butter or cheese is defined as any article not produced from pure milk or cream—salt, rennet, and coloring matter excepted—in semblance of butter or cheese and designed to be used as a substitute for either. Shall not be colored to resemble butter or cheese. Every package must be plainly marked “Substitute for butter” or “Substitute for cheese,” and each sale shall be accompanied by verbal notice and by a printed statement that the article is an imitation, the statement giving also the name of the producer. The use of these imitations in eating places, bakeries, etc., must be made known by signs.

Miscellaneous. (No law.)

## IDAHO.

**Milk.** (No law.)

**Butter.** (No law.)

**Cheese.** (No law.)

**Imitation butter.** Oleomargarine, butterine, imitation butter, or mixture imitating butter shall be branded when sold, and shall not be sold as butter.

**Imitation cheese.** (No law.)

Miscellaneous. (No law.)

**Pure food.** The adulteration of any article of food or drink with fraudulent intent, or sale of same as unadulterated, is a misdemeanor.

## ILLINOIS.

**State food commissioner.** The State food commissioner is appointed by the governor; first term after passage of law, two years; thereafter four years; salary, \$3,500 per annum. He may appoint two assistant commissioners, one an expert on dairy products, the other a chemist to be known as State analyst, at \$1,800 each per year, and not exceeding six inspectors at \$3 per day. His authority extends to all foods. State board of health shall assist in collecting samples, and State's attorney shall prosecute cases. Annual reports are made to the governor, and the publication of monthly bulletins is authorized. One thousand five hundred dollars is appropriated for the establishment of a chemical laboratory, and \$600 per year for its maintenance.

**Milk.** Milk standard, 12 per cent total solids, 3 per cent fat (must be from healthy cows and free from preservative).<sup>1</sup> Cans and vehicles used in the retail trade of milk shall be marked with the dealer's name and the locality whence milk comes. *Cream.*—(Coffee cream shall contain at least 15 per cent fat and whipping cream 22 per cent fat.)<sup>1</sup> *Skimmed milk.*—Skimmed milk may be sold as such, and each can or vessel shall be plainly marked “Skimmed milk.” *Condensed milk.*—(Condensed milk shall be made from milk containing at least 3 per cent of butter fat and evaporated to one-third or less of original volume. The word

<sup>1</sup> See footnote, page 45.

"cream" on cans is evidence of fraud; condensed skim milk must be so labeled. Canned goods must be labeled to show grade, and name of manufacturer.)<sup>1</sup> The addition of sugar to condensed milk is permitted. *Adulterated milk.*—The sale of adulterated or diseased milk, or its delivery to a factory, is prohibited. Adulteration after delivery to a factory is a misdemeanor.

**Butter.** (Shall contain at least 80 per cent fat.)<sup>1</sup>

Cooperative creameries and butter factories shall give bond in the penal sum of \$6,000 and keep a monthly report of their operations posted conspicuously in factory for the inspection of patrons.

**Cheese.** ("Whole milk" cheese must contain at least 48 per cent fat to total solids.)<sup>1</sup>

**Imitation butter.** Imitation butter is defined as any article not produced from pure milk or cream—salt, rennet, and coloring matter excepted—in semblance of butter and designed to be used as a substitute for it. Shall not be colored to resemble butter. All packages must be plainly branded "Oleomargarine," "Butterine," "Substitute for butter," or "Imitation butter." Each sale shall be accompanied by notice to the purchaser that the substance is imitation butter. (Imitation butter shall not be sold as "Creamery" or "Dairy.")<sup>1</sup>

The State's attorney is charged with enforcement of the law relating to "Substitutes for butter."

**Imitation cheese.** Imitation cheese must be distinctly marked with true and appropriate name of the article, and label bearing such name must be delivered with same when sold.

**Miscellaneous.** Care and food of dairy cows regulated.

**Pure food.** An article of food is diseased and adulterated when inferior substances have been mixed with it; when any valuable constituent has been abstracted; if it is an imitation of or sold as another article; if it is altered to conceal inferiority; if it contains any poisonous or injurious substance; if it is decomposed or from an unhealthy animal, etc. With certain common exceptions and labeled articles, all such are prohibited.

## INDIANA.

**Inspector of foods.** The State health officer is designated State inspector of foods and drugs. The State board of health investigates adulterations of foods and establishes measures for enforcement of the law. Health officers throughout the State act as food inspectors.

**Milk.** (Milk standard, 3 per cent fat, 9 per cent solids not fat.)<sup>2</sup> *Adulterated milk.*—The sale of adulterated, diseased, etc., milk to anyone or its delivery to a factory is prohibited. (Use of any coloring matter or antiseptic is an adulteration: milk from a cow near time of parturition or diseased or improperly fed is considered adulterated.)<sup>2</sup>

**Butter and cheese.** (Butter and cheese shall be made exclusively from milk and cream, with or without salt or [enumerated] coloring matters, etc.)<sup>2</sup> The use of poisonous or deleterious substances in their manufacture is prohibited. *Butter.*—(Defined, shall contain at least 80 per cent fat and not over 15 per cent water or 6 per cent salt, and shall contain no foreign fat nor preservative, etc.)<sup>2</sup> *Cheese.*—(Cheese containing any antiseptic other than salt shall be considered adulterated unless labeled with name of antiseptic.)<sup>2</sup> *Skimmed cheese.*—(Cheese containing less than 10 per cent fat shall be plainly marked "Skim-milk cheese.")<sup>2</sup>

<sup>1</sup> See footnote, page 45.

<sup>2</sup> See footnote, p. 48.

**Imitation butter.** Butter other than that made from pure milk, when sold or used in hotels, etc., must be plainly labeled "Oleomargarine." (Margarine is defined; considered adulterated if it contains over 15 per cent water or 6 per cent salt or any glucose or preservative or other than certain colors.)<sup>1</sup>

**Imitation cheese.** (Cheese containing any other fats than milk fats shall be plainly marked "Filled cheese.")<sup>1</sup>

**Miscellaneous.** (No law.)

**Pure food.** An article of food is deemed adulterated when inferior substances have been mixed with it; when any valuable constituent has been abstracted; if it is in imitation of or sold as another article; if it is decomposed or from an unhealthy animal; if it is colored to conceal inferiority; if it contains any poisonous or injurious substances, etc. With certain common exceptions, which must be labeled, such articles are prohibited. (A food containing an antiseptic shall be considered adulterated unless plainly labeled with name of antiseptic used.)<sup>1</sup>

## IOWA.

**Dairy commissioner.** The dairy commissioner is appointed by the governor, shall have practical knowledge of dairying; term of office, two years; salary, \$1,500 per annum; shall give bond for \$10,000. He may employ clerical help at \$75 per month and an agent at \$3 per day in each city of over 10,000 inhabitants to collect milk samples. (In addition to salary of the commissioner, an appropriation of \$4,000 is made for the conduct of the office.)<sup>2</sup>

**Milk.** Milk standard, 12½ per cent solids, 3 per cent fat. Milk dealers in cities shall register with the dairy commissioner and receive permits from him. Tests of milk in factories, etc., must be accurate; certified test bottles are furnished by the commissioner. *Skimmed milk.*—Skimmed milk may be sold as such. *Cream.*—Standard, 15 per cent fat. *Adulterated milk.*—The sale of adulterated, unwholesome, and diseased milk, or delivery to a factory, is prohibited.

**Butter.** (No law.)

**Cheese.** *Skimmed-milk cheese.*—Skimmed-milk cheese shall be plainly marked.

**Imitation butter and cheese.** Imitation butter and cheese is defined as any article not produced from pure milk or cream—salt, rennet, and coloring matter excepted—in semblance of butter or cheese and designed to be sold as a substitute for either of them. Shall not be colored to resemble butter or cheese. Every package shall be plainly marked "Substitute for butter" or "Substitute for cheese," and each sale shall be accompanied by a verbal notice and by a printed statement that the article is an imitation, the statement giving also the address of the maker. The use of these imitations in hotels, bakeries, etc., must be made known by signs.

**Miscellaneous.** Persons engaged in dairying shall keep their premises in hygienic condition and shall report statistics, etc., to the dairy commissioner. Care of cows is regulated.

## KANSAS.

**Milk.** *Adulterated milk.*—The sale of adulterated, skimmed, tainted, or diseased milk, or its delivery to any butter or cheese factory, is prohibited.

**Butter.** (No law.)

**Cheese.** (No law.)

**Imitation butter.** (No law.)

<sup>1</sup> See footnote, page 48.

<sup>2</sup> See footnote, page 49.

Imitation cheese. (No law.)

Miscellaneous. (No law.)

**Pure food.** Any article of food or drink is deemed adulterated if any injurious or inferior substance has been added to it, if any valuable constituent has been removed, if it is an imitation of or sold as another article, if it is diseased or tainted, if it is colored to conceal inferiority. With certain exceptions, which must be plainly labeled, such articles are prohibited.

## KENTUCKY.

**Milk.** *Skimmed milk.*—Skimmed milk shall not be sold with intent to defraud. *Adulterated milk.*—Adulterated milk, or milk from a diseased animal or an animal fed on “brewers’ slop,” etc., shall not be sold or used in the manufacture of butter or cheese.

**Butter.** (No law.)

**Cheese.** (No law.)

**Imitation butter.** Oleomargarine, butterine, or kindred compound, made in such form and sold in such manner as will advise the customer of its real character, and free from color or other ingredient to cause it to look like butter, is permitted.

**Imitation cheese.** (No law.)

**Miscellaneous.** (No law.)

**Pure food.** An article of food or drink is deemed adulterated if any inferior or injurious article has been added to it, if it is an imitation of or sold as another article, if it is colored to conceal inferiority, if it is diseased or decomposed, etc.; such articles are prohibited. Inspections and analyses are made under the supervision of the Kentucky Experiment Station. Falsely branding products to be sold is prohibited.

## LOUISIANA.

**Milk.** (No law.)

**Butter and cheese.** Wholesale packages of butter and cheese and packages from which these are sold at retail shall be stamped to show true quality.

**Imitation butter.** Such substances as oleomargarine, butterine, bogus butter, etc., shall be plainly labeled to indicate their composition. They shall not be sold as butter.

**Imitation cheese.** (No law.)

**Miscellaneous.** (No law.)

**Pure food.** An article of food or drink is deemed adulterated if any inferior or injurious substance has been added to it, etc. Such are prohibited. The State board of health is charged with the investigation of adulterations of foods; analyses may be published.

## MAINE.

**Milk.** Milk standard, 12 per cent solids, 3 per cent fat. All glassware used for testing milk delivered at factories must be tested for accuracy under the direction of the director of the experiment station. Specific gravity of sulphuric acid used in testing milk or cream must be at least 1.82. Persons using the Babcock test for apportioning the value of milk or cream must hold a certificate from the superintendent of the dairy school of the State College of Agriculture. *Skimmed milk.*—Skimmed milk must not be sold as pure milk. *Adulterated milk.*—Sale of adulterated and diseased milk, and that from cows fed on distillery or brewery refuse, etc., is prohibited.



Milk inspectors shall be appointed in towns of more than 3,000 inhabitants, and may be appointed in smaller towns. They are required to keep a record of the names and addresses of all dealers.

**Butter and cheese.** Butter and cheese are defined as the products usually so called, and manufactured exclusively from milk or cream, with salt and rennet, and with or without coloring matter.

**Imitation butter and cheese.** Any article in imitation of yellow butter or cheese and not made exclusively of milk or cream is prohibited.

**Miscellaneous.** (No law.)

## MARYLAND.

**Milk.** All persons supplying milk to cities and towns shall register their cattle with the live stock sanitary board.

The mayor and city of Baltimore shall make regulations for the sale and provide by ordinance for the inspection of milk and food products; shall provide for and fix compensation of inspectors and analysts.

**Butter.** (No law.)

**Cheese.** Cheese made from pure skimmed milk is permitted.

**Imitation butter.** The manufacture, sale, transfer, etc., of any article containing any fat or oil not produced wholly from pure milk or cream, and which is in imitation of pure yellow butter, is prohibited; but oleomargarine, free from color to cause it to look like yellow butter and made in such form and sold in such manner as will advise the purchaser and consumer of its real character, is permitted. Placards reading "Oleomargarine sold here" shall be displayed where it is sold; it shall not be sold as butter; it shall not be used in public eating places, hospitals, schools, etc., unless guests or inmates are orally informed and signs are displayed reading "Oleomargarine used and served here."

**Imitation cheese.** (No law.)

**Miscellaneous.** The live stock sanitary board shall have inspected, at least annually, all premises where cows are kept and enforce rules for sanitary conditions—proper construction of stables, cleanliness, care of cows, etc. At request of owners shall furnish certificates of health when the rules are complied with. Appropriation for expenses, \$3,000 annually.

**Pure food.** Diseased, corrupted, or unwholesome milk or other foods shall not be sold. Mixing or coloring any article of food or drink with any ingredient for gain, unless same is handled under its true name and its package is plainly marked, etc., is prohibited.

State board of health is given special powers and assistance to detect and expose adulterations and corruptions of foods and to conduct prosecutions. Two thousand five hundred dollars are annually appropriated for making chemical and scientific examinations of suspected foods and drinks.

## MASSACHUSETTS.

**Dairy bureau.** The governor shall appoint three members of the board of agriculture to constitute a dairy bureau; term of office, three years; compensation, \$5 per day of actual service. Secretary of board<sup>1</sup> is executive officer of the bureau, and receives therefor \$500 per annum in addition to salary from board. Governor may appoint an assistant to the secretary; salary, \$1,200 per annum. Agents, assistants, experts, etc., may be employed when necessary. Expenditures limited to \$7,000 a year.

<sup>1</sup> See first footnote, page 53.

**Milk.** Milk standard from April to September, 12 per cent total solids—9 per cent solids not fat, 3 per cent fat; in other months, 13 per cent total solids—9.3 per cent solids not fat, 3.7 per cent fat. Milk dealers are registered and peddlers are licensed. *Skimmed milk.*—Skimmed milk includes that below the standard for pure milk. It must contain at least 9.3 per cent solids not fat and be plainly marked "Skimmed milk." *Condensed milk.*—Condensed milk must be labeled with name of manufacturer; if in hermetically sealed packages, brand and contents must be given. *Adulterated milk.*—The sale of adulterated, diseased, or below-standard milk, or its possession with intent to sell, is prohibited. Convictions for selling adulterated milk are advertised in the newspapers.

Milk inspectors are appointed by the mayor and aldermen of cities and selectmen of towns.

**Butter and cheese.** For the purpose of an early act, butter and cheese are defined as products usually known by these names and made exclusively from milk or cream, with salt or rennet, and with or without coloring matter.

**Imitation butter.** The sale, or possession with intent to sell, of an article made wholly or partly out of any fat or oil, etc., not from pure milk or cream and which is in imitation of yellow butter, is prohibited; but oleomargarine, free from color or other ingredient to cause it to look like butter, and made in such form and sold in such manner as will advise the consumer of its real character, is permitted. It shall not be sold as butter, nor shall words like "dairy," "creamery," etc., or the name of any breed of dairy cattle be used in connection with it. All packages exposed for sale must be plainly marked "Oleomargarine," and labels similarly marked must accompany retail sales. Stores where it is sold and wagons used for delivery must display signs, and hotels, etc., using it must notify guests. Persons selling oleomargarine must be registered and conveyers licensed. *Renovated butter.*—Renovated or process butter shall be plainly labeled "Renovated butter."

Milk inspectors are charged with the inspection of imitation butter.

**Imitation cheese.** All articles in imitation of or intended as substitutes for cheese, not made exclusively of milk or cream, etc., must be plainly marked "Imitation cheese." Labels similarly marked must accompany retail sales.

Milk inspectors are charged with the inspection of imitation cheese.

**Miscellaneous.** Feeding garbage to milch cows is prohibited.

## MICHIGAN.

**Dairy and food commissioner.** The dairy and food commissioner is appointed by the governor; term of office, two years; salary, \$1,200 per year; must give bond for \$10,000; shall appoint a deputy commissioner at \$1,000 and a chemist at not more than \$1,200 per year, and may appoint two clerks at \$60 per month each, six inspectors at \$3 per day, and an assistant chemist at \$1,000 per year. Authority extends to all food and drink products. Commissioner shall make detailed annual reports to the governor and issue popular monthly reports on foods, adulterations, etc. Annual appropriation, \$18,000.

**Milk.** Milk standard, 12½ per cent total solids, 3 per cent fat, specific gravity, between 1.029 and 1.033. *Skimmed milk.*—The specific gravity of skimmed milk must be between 1.032 and 1.037. It may be sold for what it is from cans plainly labeled "Skimmed milk." *Adulterated milk.*—The sale of adulterated, diseased, preserved, etc., milk to any person, or its delivery to a factory, is prohibited. Milk from sick cows or those fed on distillery refuse, etc., is forbidden.

The police commissioners of Detroit shall appoint an officer to act as milk inspector in that city. He shall inspect dairies, milk shops, etc., in Wayne County.

Common councils or boards of trustees in cities and towns may appoint and fix the compensation of milk inspectors.

**Butter and cheese.** Butter and cheese shall not contain any poisonous or deleterious substance. Proprietors of butter and cheese factories purchasing milk from more than three persons shall register with the dairy and food commissioner. *Cheese.*—A registered brand, with a suitable device, and the words "Michigan full-cream cheese," for use on full-cream cheese and their packages, will be furnished for \$1 to factories applying to the commissioner. False brands are prohibited.

**Imitation butter.** Oleomargarine is defined as any substance formerly known by this or similar name, or as certain extracts or mixtures of fats, oils, etc., made in imitation of or to be used as butter. Every package must be plainly labeled with true name, the address of the manufacturer, and the names of all ingredients. The use of dairy terms in connection with its sale is forbidden. Placards must be displayed where it is sold and in public eating places where it is served. Verbal information and printed notice must accompany each sale. *Process butter.*—Process butter must be plainly labeled.

**Imitation cheese.** Any article in semblance of pure cheese, containing melted butter or fats, or oils not produced from milk, is prohibited.

**Miscellaneous.** (No law.)

**Pure food.** An article of food is deemed adulterated when inferior substances have been mixed with it: when any valuable constituent has been abstracted; if it is in imitation of or sold as another article: if it is decomposed or from an unhealthy animal; if it is colored to conceal inferiority; if it contains any poisonous or injurious substances, etc. With certain common exceptions, such articles are prohibited.

## MINNESOTA.

**Dairy and food commissioner.** The dairy and food commissioner is appointed by the governor. Term of office, two years: salary, \$1,800 per annum. He may appoint an assistant commissioner at a salary of \$1,500 per year, a chemist at \$1,500 per year, a secretary at \$1,200 per year, and an assistant chemist and necessary inspectors at \$100 per month each. Biennial reports are made to the legislature. May issue bulletins. His authority extends to other foods. Fifteen thousand dollars is annually appropriated for his work.

**Milk.** Milk standard, 13 per cent solids,  $3\frac{1}{2}$  per cent fat. Persons receiving milk shipped by train or cars must empty the vessels before the milk is sour and immediately clean them. Milk-testing apparatus must be standard. *Cream.*—Cream standard, 20 per cent fat. *Skimmed milk.*—Skimmed milk may be used for making skin cheese. Cans containing skimmed milk for sale must be plainly marked "Skimmed milk." *Adulterated milk.*—Unclean, unhealthy, adulterated, etc., milk includes that drawn from cows near the time of parturition, or fed on distillery waste, etc. (ensilage excepted). Its sale or exchange or delivery to any factory, or its use for making cream or any food, is prohibited. The use of preservatives is prohibited.

Milk shippers and sellers shall make detailed reports to commissioner.

Milk dealers in towns of more than 1,000 inhabitants shall annually obtain from the commissioner, at the cost of \$1, a license and give certain information regarding the conduct of their business.

Any city council may provide for the inspection of milk, dairies, and herds supplying milk for city use.

**Butter and cheese.** Use of preservatives is prohibited. Unless all the milk delivered is bought by a factory, none of it shall be used by the operators

for themselves without the consent of the owners. Factories shall keep a detailed account of their operations, open to the inspection of patrons. Factory proprietors shall make detailed reports to the commissioner. *Cheese*.—At least 45 per cent of the total solids of cheese must be fat. It shall not be falsely branded. A registered brand with a motto and the words "Minnesota State full-cream cheese," for use on full-cream cheese and their packages, is issued to factories upon application to the commissioner. *Skim cheese*.—Skim cheese is that below the standard for full-cream cheese. It is permitted if the packages are plainly marked "Skim cheese." A placard must be displayed where it is sold.

**Imitation butter and cheese.** The manufacture or sale of any substance in imitation of butter or cheese is prohibited.<sup>1</sup> Coloring oleomargarine to resemble butter is prohibited. Notice of use of oleomargarine in public eating places must be given. *Patent butter*.—Butter made by any process by which casein and other ingredients of milk are made to replace pure fat shall be plainly marked "Patent butter," and a printed card stating its ingredients shall be given to each purchaser. *Renovated butter*.—Every package of process, or renovated, butter shall be plainly labeled "Renovated butter."

**Miscellaneous.** Milch cows shall not be kept in a crowded or unhealthy condition nor fed unwholesome food or any that produces impure milk.

**Pure food.** The adulteration of food or the sale of adulterated food is a misdemeanor.

## MISSISSIPPI.

**Milk.** (No law.)

**Butter.** (No law.)

**Cheese.** (No law.)

**Imitation butter.** Packages of oleomargarine or similarly manufactured butters shall be plainly labeled with the correct name of their contents, and the product shall be sold by that name. A privilege tax of \$5 is imposed upon persons selling the articles named.

**Imitation cheese.** (No law.)

**Miscellaneous.** It is unlawful to milk the cow of another, or to confine her with intent to take her milk, without the consent of the owner.

## MISSOURI.

**State board of agriculture.** The State board of agriculture is charged with the enforcement of the act relating to butter substitutes and cheese branding. (Appropriation, \$5,000 for two years.)<sup>2</sup>

**Milk.** All cities and towns have power to license dairies, provide for inspection, etc.

**Butter.** (No law.)

**Cheese.** Cheese made from milk testing at least 3 per cent fat, or cream from the same, is deemed a full-cream cheese. *Skim cheese*.—Any cheese not made from pure milk testing at least 3 per cent fat, or cream from the same, shall be plainly branded "Skimmed-milk cheese" or "Not full-cream cheese," and its true name given.

**Imitation butter.** Imitation butter is defined as every article not produced wholly from pure milk or cream, made in semblance of and designed to be used as a substitute for pure butter; it shall not be sold as butter; shall not be colored to resemble butter unless it is to be sold outside the State; original packages shall be plainly stamped "Substitute for butter;" in hotels, etc., vessels in which it is served must be marked "Oleomargarine," or "Impure butter."

<sup>1</sup> See footnote, p. 62.

<sup>2</sup> See footnote, page 66.



**Imitation cheese.** Any article not produced wholly from pure milk or cream and designed to take the place of cheese shall have its original packages stamped with its true name.

**Miscellaneous.** (No law.)

## MONTANA.

**Milk.** (No law.)

**Butter.** (No law.)

**Cheese.** (No law.)

**Imitation butter and cheese.** Any article in semblance of butter or cheese, and not made wholly from milk or cream, must be plainly labeled "Oleomargarine" or "Imitation cheese," and a printed label bearing the same word or words must be delivered to the purchaser with retail sales. Places where these articles are sold or used must display signs, and information as to their character be given if requested. Dealers must pay a license of 10 cents a pound on each pound sold.

**Miscellaneous.** Cows shall not be kept in unsanitary places or fed food that produces unwholesome milk.

## NEBRASKA.

**Deputy food commissioner.**<sup>1</sup> The governor of the State is food commissioner and appoints a deputy at a salary of \$1,500. The latter holds office at pleasure of the governor and must be a person with knowledge of dairy products; he must give a bond for \$3,000; may employ a clerk at \$75 per month, and a chemist; reports annually to the governor; authority extends to vinegar and cider. Appropriation \$5,000, but shall not exceed revenue from act.

**Milk.** Milk and cream standards may be established by the food commissioner.  
*Adulterated milk.*—The sale of adulterated, skimmed, diseased, or tainted milk, or its delivery to a factory, is prohibited.

**Butter and cheese.** No poisonous or deleterious matter shall be used in the manufacture of butter or cheese. Wholesale dealers in butter and cheese, creameries, cheese factories, and skimming stations are defined, and must pay for annual permits as follows: Wholesale dealers, \$10; creameries, \$10; cheese factories, \$10; skimming stations, \$1. *Ladle butter.*—Manufacturers of ladle butter are defined; must pay \$15 for annual permits.

Use of cream by employees of a factory without permission of patrons is prohibited.

**Imitation butter and cheese.** Imitation butter or cheese is defined as any article made in semblance of and designed to be used as a substitute for pure butter or cheese, and not produced wholly from pure milk or cream; the use of salt, rennet, and harmless coloring matter are permitted. These articles, including any having melted butter added to them, shall not be colored to resemble butter or cheese; shall be plainly marked "Imitation butter" or "Imitation cheese;" verbal and printed information of the character of the articles and address of the maker shall be given at time of sale; signs shall be displayed in public eating places where used. Manufacturers and dealers, except retailers, shall report monthly, amounts sold, to whom, etc. Manufacturers and dealers in imitations are defined and must pay for annual permits as follows: Manufacturers of imitation butter or cheese, \$100; wholesale dealers in imitation butter or cheese, \$50—this not required from manufacturers who sell their own products only; retail dealers in imitation butter or cheese, \$25.

<sup>1</sup> See footnote, page 67.

Miscellaneous. (No law.)

**Pure food.** Any article of food or drink is deemed adulterated if any inferior or injurious substance has been mixed with it, if any valuable constituent has been removed, if it is in imitation of or sold as another article, if it is diseased, decomposed, infected, if it is colored to conceal inferiority, etc. With certain exceptions, which shall be labeled, such articles are prohibited.

## NEVADA.

**Milk.** *Skimmed milk.*—Skimmed milk may be sold as such. *Adulterated milk.*—

The sale or exchange of adulterated milk, or milk from cows which are improperly cared for, or fed "swill" or other decomposed matter, is a misdemeanor.

Milk inspectors are appointed and their compensation fixed by board of county commissioners. They shall inspect milk sold by venders and prosecute violations.

**Butter.** (No law.)

**Cheese.** (No law.)

**Imitation butter.** Any article in semblance of butter but not made exclusively of milk or cream, or containing melted butter, shall be in packages plainly marked "Oleomargarine."

**Imitation cheese.** (No law.)

**Miscellaneous.** Care of cows regulated.

## NEW HAMPSHIRE.

**Milk.** Milk standard, 13 per cent solids. It shall be sold by wine measure, and the capacity of vessels shall be marked upon them. *Skimmed milk.*—Milk from which any cream has been removed can be sold only from vessels plainly marked "Skimmed milk." *Adulterated milk.*—The sale of adulterated, unwholesome, diseased, etc., milk, and that from cows fed on brewery refuse, etc., is prohibited.

The mayor and aldermen of cities and the selectmen of towns may appoint and fix the compensation of milk inspectors. In towns having inspectors all milk dealers must register and obtain, at the cost of 50 cents per year, a license which gives full details as to the conduct of their business. Names of persons convicted of selling adulterated milk are published.

**Butter and cheese.** "Butter" and "cheese" are understood to mean the products usually known by those names, and which are manufactured exclusively from milk or cream, with salt, and with or without coloring matter, and if cheese, with rennet.

**Imitation butter and cheese.** Any article not made wholly from unadulterated milk or cream which is in imitation of pure yellow butter or cheese is prohibited, unless in packages plainly marked "Adulterated butter," "Oleomargarine," or "Imitation cheese." A label printed with the words on the original package shall be delivered with each retail sale. Oleomargarine free from color or ingredient to cause it to look like butter, and made in such form and sold in such manner as will advise the consumer of its real character, is permitted. Notice of the use of substitutes for butter in hotels, etc., shall be given to patrons.

The State board of agriculture is in charge of the enforcement of the laws on this subject.

**Miscellaneous.** (No law.)

## NEW JERSEY.

**Dairy commissioner.** Dairy commissioner is appointed by State board of health; term of office, three years; salary, \$2,000 per annum. He may appoint and fix the compensation of such assistants, chemists, agents, clerks, and counsel as are necessary. Expenses are limited to \$10,000 per year. Authority is extended to all foods and drugs.

**Milk.** Milk standard, 12 per cent solids. *Skimmed milk.*—Skimmed milk shall be sold only in or from cans plainly marked "Skimmed milk." In cities of the first class it is prohibited. *Adulterated milk.*—The sale of adulterated or unwholesome milk or its delivery to a cheese factory is prohibited. It is defined as any which has been adulterated by the addition of any substance, or any from cows poorly cared for or fed unwholesome foods, or that has been exposed to infection by diseased persons, etc.

It is unlawful for any person to use a milk can belonging to another and marked with the owner's name or initials without his consent. If they are so used and found, their contents may be emptied.

**Butter and cheese.** The terms natural butter and natural cheese are taken to mean the products usually so called, made exclusively from milk or cream, with salt and rennet and with or without coloring matter or sage. Each butter or cheese package must be branded with its weight and the name of the manufacturer.

**Imitation butter and cheese.** Any article made wholly or partly out of any fat, oil, etc., not from pure milk or cream, artificially colored in imitation of pure yellow butter, is prohibited; but oleomargarine and imitation cheese are permitted if free from artificial color and in original package, encircled by a wide black band bearing the name of the maker and having the name of the contents plainly branded on them with a hot iron. Retail sales shall be accompanied by a printed card on which the name of the substance and the address of the maker are plainly printed, and the customer shall be orally informed of the character of the article at the time of sale.

**Miscellaneous.** Cows shall be properly cared for and fed. Milch cows kept in towns shall be registered. State dairy commissioner shall be notified when any of them are supposed to be diseased.

A commission of five is appointed by the president of the State board of agriculture to investigate tuberculosis. Owners are paid half value of condemned animals.

**Pure food.** An article of food or drink is deemed to be adulterated if any inferior or injurious substance has been added to it, if any valuable constituent has been removed, if it is an imitation of or sold as another article, if it is diseased or decomposed, if it is colored to conceal inferiority, etc. With the exception of articles named by the board of health and ordinary articles of food, which shall be branded, such articles are prohibited.

## NEW MEXICO.

**City councils.** City councils shall provide for the inspection of dairy products.

**Milk.** (No law.)

**Butter.** (No law.)

**Cheese.** (No law.)

**Imitation butter.** (No law.)

**Imitation cheese.** (No law.)

**Miscellaneous.** (No law.)

**Pure food.** Any article of food or drink shall not be knowingly sold if it is unhealthy, or if any valuable constituent has been removed from it, or if it contains ingredients not asked for, unless notice is given to the purchaser. The use of an injurious coloring matter or any diseased or decomposed substance in the manufacture of food is prohibited.

## NEW YORK.

**Commissioner of agriculture.** Commissioner of agriculture is appointed by the governor; term of office, three years; salary, \$4,000 per annum. He may appoint assistant commissioners, chemists, clerks, agents, and counsel necessary for the work of his office and fix their compensation; also may appoint five expert butter and cheese makers to inspect factories, give instruction, etc.

**Milk.** Milk standard, 12 per cent solids, 3 per cent fat. Pure milk is defined as sweet and unadulterated; pure cream is that taken from such milk. Milk shall not be kept in unclean vessels nor in unsanitary places. All cans, etc., containing milk to be sold in counties other than where produced, must be plainly branded with name of the county of production; vehicles from which it is sold must be similarly marked. Glass bottles are excepted from the provision, but they must bear the name of the vender. *Skimmed milk.*—Skin milk may be delivered to skim-cheese factories, and, except in New York and Kings counties, it may be sold as skimmed milk for use in the county where it is produced or an adjoining county. *Condensed milk.*—Condensed milk must be made from pure and wholesome milk, and its proportion of milk solids shall be in quantity the equivalent of 12 per cent of milk solids in crude milk, of which 25 per cent shall be fat. All packages of condensed milk shall be labeled with name of manufacturer, etc. *Adulterated milk.*—Adulterated milk is defined as any below the standard, or which has been altered, or any from cows poorly cared for or fed certain unwholesome foods. Its sale, exchange, delivery to a butter or cheese factory, or use for any food is prohibited. Pure skim milk is excepted as above. Preservatives and poisonous colors are prohibited.

**Butter and cheese.** Butter and cheese are defined as the products of the dairy usually known by those terms, manufactured exclusively from pure unadulterated milk or cream, with or without salt, rennet, coloring matter, or sage. False brands are prohibited. County trade-marks may be adopted by county dairymen's associations. Preservatives and poisonous colors are prohibited. *Cheese.*—A registered brand, with the words "New York State full cream cheese," for use on full milk cheese and their packages, will be furnished to factories applying to the commissioner of agriculture. *Skim cheese.*—Pure skim cheese may be made from clean, pure skim milk.

Unless factory operator buys all the milk delivered, he shall not use any of it or its products without consent of the owners, and he must keep an account of all factory operations for the inspection of his patrons.

**Imitation butter and cheese.** Imitations shall not be sold as butter or cheese. The terms oleomargarine, butterine, imitation butter, or imitation cheese mean any article in the semblance of butter or cheese not the usual product of the dairy and not made exclusively from unadulterated milk, or having any oil, lard, melted butter, etc., as a component part. *Imitation butter.*—The manufacture of oleomargarine or any article in imitation of butter wholly or partly from fats or oils not produced from milk, or the sale or the use in hotels, etc., of such articles, is prohibited. No article intended as an imitation of butter and containing oils, fats, etc., not from milk, or melted butter in any condition, shall be colored yellow. *Renovated butter.*—Butter produced by melting original



packing stock, etc., shall be plainly labeled "Renovated butter." *Imitation cheese*.—The manufacture or sale of any article in imitation of pure cheese, into which any animal fat, oil, or butter, etc., is introduced is prohibited.

**Miscellaneous.** Milch cows shall not be kept in an unsanitary condition nor be fed distillery waste, spoiled feeds, or any food that injures milk; silage is permitted.

#### NORTH CAROLINA.

**Milk.** (No law.)

**Butter.** Butter is defined as the product manufactured from fresh and pure milk and cream.

**Cheese.** (No law.)

**Imitation butter.** Oleomargarine and butterine are defined as articles manufactured in imitation of butter, and which are composed of any ingredient or ingredients in combination with butter. Original packages shall be labeled with names of chemical ingredients and their proportions.

District, county, and city attorneys shall prosecute offenders against oleomargarine law.

**Imitation cheese.** (No law.)

**Miscellaneous.** (No law.)

**Pure food.** An article of food or drink is deemed adulterated if any inferior or injurious substance has been added to it, if any valuable constituent has been removed, if it is an imitation of or sold as another article, if it is colored to conceal inferiority, if it is decomposed or unfit for food, if it is misbranded, etc. With the exception of mixtures, etc., known by distinctive names, labeled as mixtures, or containing matter unavoidably or necessarily added in preparation for commerce, such articles are prohibited. No conviction when defendant can prove written guaranty of purity from supplier.

The board of agriculture shall fix standards of foods, beverages, and condiments, and publish results of examinations made by the chemists of the department of agriculture. Upon evidence from the commissioner of agriculture, solicitors shall conduct prosecutions under pure-food law.

#### NORTH DAKOTA.

**Assistant dairy and food commissioner.** The commissioner of agriculture appoints a deputy known as the assistant dairy and food commissioner, who is familiar with the manufacture of dairy products; term, same as commissioner's; salary, \$600 per year. One thousand dollars annually and the fines collected in prosecutions are appropriated for his work. Detailed reports are made biennially. He acts also as director of farmers' institutes.

**Milk.** Milk standard, 12 per cent solids, 3 per cent fat. Venders in cities or towns of more than 1,000 inhabitants must furnish certain information to the assistant commissioner and obtain license from him. *Cream*.—Cream shall contain at least 15 per cent fat. *Skimmed milk*.—Skimmed milk shall be sold for what it is. *Impure milk*.—The disposal or use in any human food of unhealthy, adulterated, etc., milk, or cream from same, is prohibited.

**Butter and cheese.** For the purpose of one act, butter and cheese are defined as the products usually known by those names and which are manufactured exclusively from milk or cream. Creameries shall brand each package of butter and cheese, showing quality of product, number of factory, etc. The brands are registered with the assistant commissioner. Managers of creameries and cheese factories shall make annual reports on blanks furnished for the purpose. *Skimmed-milk cheese*.—Cheese made from milk which has been skimmed shall be plainly marked, on itself and on the package, "Skimmed-milk cheese."

**Imitation butter.** Any article in imitation of pure yellow butter and not made from pure milk is prohibited; but oleomargarine, free from color to cause it to look like butter, and made in a distinct form and sold in such manner as will advise consumers of its real character, is permitted. Notice of its use in public eating places must be given to patrons. Imitations shall be distinctly marked and sales shall be accompanied by a printed card giving names of the ingredients. *Renovated and patent butters.*—Butter made from melted packing stock, etc., shall be plainly labeled "Renovated butter," and that made by any process by which casein of milk or other ingredients are made to take the place of pure butter fat shall be plainly marked "Patent butter."

**Imitation cheese.** Substitutes for pure cheese, including filled cheese, shall be plainly labeled so their character and quality will be shown. Sales shall be accompanied by a printed card giving names of ingredients.

**Miscellaneous.** Cows shall be well stabled and fed pure feed.

## OHIO.

**Dairy and food commissioner.** State dairy and food commissioner is elected at the general elections: term of office, two years: salary, \$2,000 per year. He shall give bond for \$5,000. May appoint two assistant commissioners at salaries of \$1,000 per year: also appoint and fix the compensation of experts, chemists, agents, etc., as are necessary. Detailed annual report shall be made to the governor. Authority extends to all foods and drugs. (Appropriation for 1900, \$50,340.<sup>1</sup>)

**Milk.** Milk standard, 12 per cent solids, 3 per cent fat; in May and June, 11½ per cent solids. *Skimmed milk.*—Skimmed milk shall not be sold as pure milk, but it may be used for making skimmed cheese: cans containing it shall be plainly marked "Skimmed milk." *Condensed milk.*—Condensed milk shall be made from pure fresh milk; the proportion of milk solids shall be equivalent to 12 per cent in crude milk, of which 25 per cent shall be fat; package containing same shall be plainly labeled with true name and brand, and name of manufacturer. *Adulterated milk.*—The sale of adulterated, skimmed, unclean, unhealthy, etc., milk, and that from sick cows, or its delivery to a factory, is prohibited.

**Butter and cheese.** Butter and cheese are defined as the products usually known by those names, and made wholly from pure milk or cream, with salt, and with or without harmless coloring matter, and, if cheese, with or without rennet and sage. False brands are prohibited. Keeping false account of milk delivered to a factory is prohibited. *Butter.*—Standard for butter, 80 per cent fat. *Cheese.*—Must contain at least 20 per cent fat. Registered brands with the words "Ohio State full cream cheese" are issued to factories for use on full milk cheese and their packages upon application to the dairy and food commissioner and payment of fee of \$1. *Skimmed cheese.*—Cheese as above defined, and containing less than 20 per cent fat, shall be plainly marked, and have its package marked, "Skimmed cheese;" packages sold at retail shall be accompanied by a label similarly marked: exposed contents of a package shall be labeled as above with a placard, and a sign "Skimmed cheese sold here" shall be posted where it is sold; delivery wagons shall display similar signs; notice shall be given of its use in public eating places.

**Imitation butter and cheese.** With the exceptions noted below, any article in imitation of natural butter or cheese, and containing animal or vegetable oils not produced from milk, or acids, is prohibited. Any other substance not made wholly from pure milk or cream, salt, and harmless coloring

<sup>1</sup> See footnote, page 81.

matter, and appearing to be butter or cheese, may be sold only under its true name. Each roll or package shall be plainly marked with its name and the names of its ingredients, and the same shall be on a label delivered with each sale, in connection with which the use of such words as "butter," "dairy," etc., or false brands, are prohibited; information as to the substance shall be given at all retail sales; it shall not be packed so as to be concealed by a finer grade of butter; its use in State charitable and penal institutions is prohibited. Signs shall be used as described below. *Oleomargarine*.—Oleomargarine is defined as any substance not pure butter of not less than 80 per cent butter fat and made for use as butter. It is permitted if free from coloring matter or other ingredient to cause it to look like butter, and made in such form and sold in such manner as will advise the consumer of its real character. *Filled cheese*.—Any article in imitation of cheese and not made wholly of milk or cream, etc., and containing any fats, oils, etc., not produced from milk or cream, shall be plainly marked and have its package or the exposed contents of any package marked "Filled cheese;" each retail sale shall be accompanied by a label similarly marked; it shall not be sold as cheese. *Signs*.—The signs "Oleomargarine sold here" or "Filled cheese sold here" shall be displayed wherever these articles are sold, and signs and verbal information are required in public eating places where the articles are used; wagons delivering filled cheese shall display signs.

**Miscellaneous.** Milch cows shall not be kept in a cramped or unhealthy condition, nor fed unhealthy food, or food which produces unwholesome milk.

**Pure food.** Any article of food or drink is adulterated if any inferior or poisonous substance has been mixed with it; if any valuable ingredient has been removed; if it is an imitation of or sold under the name of another article; if it is decomposed, infected, or from a diseased animal; if it is colored to conceal inferiority, etc. Such articles are prohibited; but certain common mixtures are permitted if packages are labeled with names of ingredients, etc.

## OKLAHOMA.

**Milk.** *Adulterated milk*.—Milk from a cow not in proper condition of health, or any milk adulterated by water or a deleterious substance, or colored, shall not be sold or delivered.

**Butter.** (No law.)

**Cheese.** (No law.)

**Imitation butter.** (No law.)

**Imitation cheese.** (No law.)

**Miscellaneous.** (No law.)

**Pure food.** The adulteration of food or drink with fraudulent intent is a misdemeanor. Buyer shall be informed if provisions are diseased or unwholesome. Board of health shall destroy any impure article of food offered for sale.

## OREGON.

**Dairy and food commissioner.** After June, 1900, the dairy and food commissioner, who shall be well qualified in dairy matters, will be chosen by the electors of the State; term of office, four years; salary, \$1,000 per year; shall enforce the law, inspect creameries, and give dairy instruction; may appoint and fix compensation of one deputy in each county; reports to the legislature. Chemist of State agricultural college shall make analyses.

**Milk.** Milk standard, not more than 88 per cent water, nor less than 3 per cent fat, nor less than 8 per cent solids other than fat, nor less than 1.038 specific gravity after cream has been removed. *Impure milk*.—Milk from cows fed un-

wholesome feeds or near time of parturition is deemed impure. *Cream*.—Standard, 20 per cent fat. *Condensed milk*.—Standard, “12 per cent of milk solids in pure milk, 25 per cent of which shall be pure fat.”

**Butter and cheese.** Manufacturers of more than 25 pounds of butter or cheese per week shall make detailed annual reports to the commissioner.

*Butter*.—Butter standard, not more than 14 per cent water. *Process butter*.—Reworked or mixed butter shall be marked “Process butter,” and not “Creamery butter.” *Tub butter*.—Tub or packed butter, remolded into prints, etc., shall be marked “Tub butter,” and not “Creamery butter.” The use of boxes or brands of one creamery or dairy for selling the butter of another is prohibited. *Cheese*.—Standard, 40 per cent fat as compared with total solids.

**Imitation butter and cheese.** Sales of oleomargarine and all imitations of dairy products shall be recorded and records shall be open to the commissioner.

**Miscellaneous.** Milch cows shall be allowed 800 cubic feet of air space each in stables; when facing each other shall not be closer than 6 feet, unless separated by air-tight partitions at least 4 feet high. Stables shall be well ventilated and kept in a healthful condition.

**Pure food.** An article of food or drink is deemed adulterated if any inferior substance has been mixed with it, if any valuable constituent has been removed, if it is in imitation of or sold as another article, if it is colored to conceal inferiority, etc. Salt and annatto, or butter color in which annatto is the principal ingredient, are not adulterants of dairy products. Such articles shall not be sold unless plainly marked to show their true character, nor served in public eating places unless notice of their use is given.

## PENNSYLVANIA.

**Dairy and food commissioner.** The dairy and food commissioner, who shall have practical experience in the manufacture of dairy products, is appointed by the governor; term of office, four years; salary, \$2,500 per year. He shall have a clerk, appointed by the governor; salary, \$1,500 per year. Authority extends to other foods. Commissioner shall make a detailed annual report. Moneys paid into the treasury under the provisions of the 1899 oleomargarine law constitute a special fund for enforcement of that law.

**Milk.** Milk standard in cities of the second and third class, 12½ per cent solids, 3 per cent fat, specific gravity at 60° F. between 1.029 and 1.033. In towns of over 1,000 population, vehicles from which milk is vended shall be marked with names of vendors and locality of production; and in cities of the second class dairies and milk depots shall be registered by the bureau of health. *Skimmed milk*.—Skimmed-milk standard in cities of the second and third class, 6 per cent cream by volume, 2½ per cent fat by weight, specific gravity at 60° F. between 1.032 and 1.037; milk from which any cream has been taken shall not be sold unless in a vessel plainly marked “Skimmed milk.” *Adulterated milk*.—The sale of adulterated, impure, or unwholesome milk is a misdemeanor. The addition of water or ice to milk is an adulteration, and milk from animals fed on distillery waste or any substance in a state of putrefaction, or from sick or diseased cows, is declared to be impure and unwholesome. The sale of milk for human consumption which contains boracic acid salt, salicylic acid, or other drug is prohibited.

Councils of cities and boroughs may provide for milk inspection.

**Butter.** (No law.)

**Cheese.** All cheese is divided into five grades, and each cheese and its package shall be plainly branded with the address of the maker and the words



"Full cream" if it contains not less than 32 per cent of butter fat; "Three-fourths cream" if it contains not less than 24 per cent butter fat; "One-half cream" if it contains not less than 16 per cent butter fat; "One-fourth cream" if it contains not less than 8 per cent butter fat; and "Skimmed cheese" if it contains less than 8 per cent butter fat. Fancy cheese weighing less than five pounds, and pot cheese, are excepted.

**Imitation butter.** The manufacture or sale of any article not made from pure milk or cream and in imitation of pure yellow butter is prohibited; but oleomargarine, butterine, or similar substance is permitted if free from color or other ingredient to make it look like butter, and made in such form and sold in such manner as will advise the consumer of its real character, and if the manufacturer or dealer shall have a license. Every package or parcel shall be plainly labeled "Oleomargarine" or "Butterine," and signs obtained from the dairy commissioner shall be displayed where it is made or sold. Wagons of peddlers shall be plainly marked. License fees are as follows per year: Manufacturers, \$1,000; wholesalers, \$500; retailers, \$100; restaurant keeper or hotel proprietor, \$50, and boarding house keeper, \$10; the different classes are defined. Imitation butter shall not be used in any State charitable or penal institution. *Renovated butter.*—Butter made from melted packing stock, etc., as "boiled" or "process" butter shall be plainly labeled "Renovated butter" before sold or offered for sale, whether in small or large packages.

**Imitation cheese.** Cheese not produced wholly from pure milk or cream is prohibited.

**Miscellaneous.** (No law.)

**Pure food.** An article of food or drink is deemed adulterated if any inferior or injurious substance has been mixed with it; if any valuable constituent has been removed; if it is in imitation of or sold as another article; if it is diseased, decomposed, infected; if it is colored to conceal inferiority, etc. With certain exceptions, which shall be labeled, such articles are prohibited.

## RHODE ISLAND.

**Milk.** Milk standard, 12 per cent solids,  $2\frac{1}{2}$  per cent fat; shall be sold by wine measure; vessels to be sealed by the sealer of weights and measures. *Skimmed milk.*—Skimmed milk is that which has been skimmed, or is below the standard. It shall be sold only from cans plainly marked "Skimmed milk." *Adulterated milk.*—The sale or exchange of adulterated or diseased milk or that from diseased cattle or cows fed on distillery refuse, etc., is prohibited.

The mayor and aldermen of any city and the council of any town may elect and fix the compensation of milk inspectors. In Providence this is compulsory. Inspectors may appoint collectors of samples. All persons engaged in selling milk must register with the inspector and have their names on their wagons, etc. Names of persons convicted are published.

**Butter.** All butter tubs shall be marked with their weights and maker's initials.

**Cheese.** (No law.)

**Imitation butter.** Any article not made wholly from milk or cream, but containing any melted butter to take the place of cream, or animal oil or fat not the product of milk, shall be plainly marked "Oleomargarine," and a label similarly printed shall be delivered with all retail sales.

**Imitation cheese.** (No law.)

**Miscellaneous.** (No law.)

**Pure food.** The authority of milk inspectors extends to other foods.

## SOUTH CAROLINA.

**Milk.** Milk standard, 3 per cent fat,  $8\frac{1}{2}$  per cent other solids. *Skimmed milk.*—Skimmed milk is that below the standard. It and buttermilk may be sold under their own name. *Adulterated milk.*—The sale of unclean, diseased, adulterated, etc., milk, or its delivery for domestic use, or to be converted into any human food, is prohibited.

**Butter.** (No law.)

**Cheese.** (No law.)

**Imitation butter and cheese.** Imitation butter and cheese are defined as every article not produced from pure milk or cream, with or without salt, rennet, and harmless coloring matter, which is in semblance of and designed to be used as a substitute for butter or cheese. They shall not be colored to resemble butter or cheese. Original packages shall be marked "Substitute for butter," or "Substitute for cheese;" shall not be sold as genuine butter or cheese, nor used in hotels, etc., unless signs are displayed.

Statement of the chemist of the State college shall be accepted as evidence of analysis of imitation butter and cheese.

**Miscellaneous.** (No law.)

## SOUTH DAKOTA.

**Milk.** *Adulterated milk.*—The sale of unwholesome, diseased, or adulterated milk as the pure article is prohibited.

**Butter and cheese.** Butter and cheese are defined as the products usually known by those names, and which are made wholly from milk or cream or both, with salt and rennet, and with or without coloring matter.

**Imitation butter.** Any article not made wholly from pure milk or cream, and in imitation of pure butter, is prohibited; but oleomargarine, colored pink, and made in such form and sold in such manner as will advise the consumer of its real character, is permitted; notice of its use in public eating places must be given.

Health officers, sheriffs, etc., shall institute complaints, etc.

**Imitation cheese.** (No law.)

**Miscellaneous.** (No law.)

**Pure food.** Any article of food is deemed adulterated if any inferior or injurious substance has been added to it, if any valuable ingredient has been removed, if it is an imitation of or sold as another article, if it is colored to conceal inferiority, etc.; such an article shall not be offered for sale unless labeled "adulterated" and with its own common name and name of the manufacturer. No unwholesome food shall be sold without making its character known to the buyer.

## TENNESSEE.

**Milk.** (No law.)

**Butter.** (No law.)

**Cheese.** (No law.)

**Imitation butter.** Any article which is in imitation of yellow butter and not made exclusively from pure milk or cream is prohibited; but oleomargarine, free from color or other ingredient to cause it to look like butter, and made in such form and sold in such manner as will advise the consumer of its true character, and other imitations if uncolored and labeled with their correct names, are permitted; wholesale packages shall be plainly labeled, and a label shall accompany retail sales.

**Imitation cheese.** Imitation cheese may be manufactured under its true name; each package and its contents shall be stamped with the correct name, and a label, similarly printed, shall be delivered with retail sales.

**Miscellaneous.** (No law.)

**Pure food.** Any article of food or drink is adulterated if inferior substances have been added to it; if any valuable constituent has been abstracted; if it is an imitation of or sold as another article; if it contains any poisonous substance; if it is decomposed or diseased or from an unhealthy animal, etc. With certain common exceptions, such articles and all misbranded articles are prohibited.

## TEXAS.

**Milk.** (No law.)

**Butter.** (No law.)

**Cheese.** (No law.)

**Imitation butter.** (No law.)

**Imitation cheese.** (No law.)

**Miscellaneous.** Corporations may be formed for the purpose of establishing and carrying on the work of dairies and creamery companies.

## UTAH.

**Dairy and food commissioner.** The dairy and food commissioner is appointed by the governor; term of office, two years; salary, \$600; expenses limited to \$300; authority extends to all foods and drinks; biennial reports are made to the governor. County attorneys shall give legal assistance.

**Milk.** *Skimmed milk.*—Skimmed milk includes all from which any cream has been removed. It shall contain not less than 9 per cent of solids not fat, and may be sold only from vessels plainly marked "Skimmed milk." *Adulterated milk.*—Milk which has been diluted or that taken from a cow in an unnatural condition, etc., shall not be sold or delivered. Preservatives shall not be used. Standard tests and lactometers may be used to determine adulteration.

**Butter.** Preservatives shall not be used.

**Cheese.** *Skim cheese.*—Cheese made from milk from which some fat has been removed shall be in size between 9 and 11 inches in diameter and not less than 9 inches high. Preservatives shall not be used.

**Imitation butter.** Any article not made wholly from unadulterated milk or cream, which is an imitation of pure yellow butter, is prohibited. But oleomargarine, free from color or other ingredient to cause it to look like butter, and made in such form and sold in such manner as will advise the consumer of its real character, and free from misleading marks, is permitted. It shall not be sold as butter. It shall be plainly marked "Oleomargarine" when exposed for sale, signs must be displayed where it is sold, and in public eating places guests must be notified of its use. Butter not made from pure milk shall not be used in State charitable or penal institutions.

**Imitation cheese.** Cheese made from skimmed milk to which foreign fats have been added is prohibited. Cheese not made from pure milk shall not be used in State charitable or penal institutions.

**Miscellaneous.** (No law.)

## VERMONT.

**Milk.** Milk standards,  $12\frac{1}{2}$  per cent solids,  $9\frac{1}{4}$  per cent solids not fat; in May and June, 12 per cent total solids. Standard measure is wine measure. Payment for milk at factories is to be based on milk testing 4 per cent fat. *Adulterated milk.*—The sale of adulterated or skim milk or milk below the standard, or

its delivery to a factory, or the delivery of tainted milk to a factory, is prohibited. Result of analysis by the State Agricultural Experiment Station shall be deemed competent evidence in prosecutions.

Glassware used for testing milk to determine amount to be paid for it shall be examined for correctness and marked under the direction of the State Agricultural College; any person making such a test shall hold a certificate from the college.

**Butter and cheese.** Butter or cheese shall not be marked "Creamery," unless made in a creamery; marking "Private creamery" is permitted if name of maker is given.

Operators of factories shall not use any cream except with consent of owners.

Detailed monthly statements shall be given to patrons of creameries and cheese factories showing amount of milk delivered, test, and butter or cheese made therefrom, and payments shall be based on amounts of these products. Milk sold at creameries shall be tested to determine amount of butter thus disposed of. Monthly statements of milk received and butter produced shall be posted in creameries.

**Imitation butter.**<sup>1</sup> Any article made in imitation of or as a substitute for butter, and not made wholly of milk or cream, may be sold when plainly labeled "imitation butter," "oleomargine," or "butterine," as the case may be. Wrappers for retail packages shall be similarly marked. The word "dairy" or "creamery" or the name of any breed of dairy cattle on labels is prohibited.

The State's attorney is given special power for enforcing.

**Imitation cheese.**<sup>1</sup> Any article made in imitation of or as a substitute for cheese may be sold when plainly labelled "imitation cheese." Wrappers for retail packages shall be similarly marked.

The State's attorney is given special power for enforcing.

**Miscellaneous.** (No law.)

**Pure food.** A laboratory is conducted by the State board of health for the examination of water, milk, and foods, and the study of diseases.

## VIRGINIA.

**Milk.** *Adulterated milk.*—The sale of adulterated, skimmed, tainted, etc., milk, or its delivery to any creamery or cheese factory, is prohibited.

**Butter.** Butter inspectors shall brand lots of butter offered for inspection according to quality.

Factory employees shall not use cream without consent of its owners.

**Cheese.** *Skimmed cheese.*—Skimmed cheese may be made from pure skimmed milk. Factory employees shall not use cream without consent of its owners.

**Imitation butter.** The manufacture or sale of any article made wholly or partly from any fat or oil not produced from unadulterated milk or cream, and which is in imitation of pure yellow butter, is prohibited; but oleomargarine, butterine, or kindred compound, made in such form and sold in such manner as will advise the consumer of its real character, and free from color or other ingredient to cause it to look like butter, is permitted. Signs, with the words "Imitation butter used here," shall be displayed in eating places, bakeries, etc., where the articles above named are used.

**Imitation cheese.** The manufacture or sale or use in public eating places of any article in imitation of and designed to take the place of pure cheese, and not made wholly from milk or cream, is prohibited.

**Miscellaneous.** (No law.)

**Pure food.** The board of agriculture may establish standards for foods and, assisted by experts of the department of agriculture, examine foods to protect

<sup>1</sup> See footnote, page 95.



against adulteration and misbranding; may prescribe how compounds shall be branded; may publish results of examinations; commonwealth's attorneys assist in prosecutions. An article of food is deemed adulterated if any inferior or injurious substance has been added to it or any valuable constituent has been removed from it so it will deceive the purchaser, if it is an imitation of or sold as another article, if it is colored to conceal inferiority, if it is labeled to mislead the purchaser, if it is diseased or decomposed, etc. With the exception of certain well-known or labeled articles, etc., no person shall knowingly manufacture or sell such articles of food.

### WASHINGTON.

**Dairy and food commissioner.** Dairy and food commissioner is appointed by the governor; term of office, four years; salary, \$1,500; must give bond for \$5,000. He may appoint six deputies at \$3 per day, but no one is to be employed at the cost of the State more than 30 days in a year; the services of chemists of State institutions are available; attorney-general and county prosecuting attorneys shall assist, but special counsel may be employed. Appropriation, \$3,000 per year in the interest of dairying and \$1,000 in the interest of pure food. A "State board of dairy and food commission" is constituted of the secretary of state, professor of agriculture at the agricultural college, and dairy commissioner; members receive no salary, but are allowed traveling expenses; they report to the governor biennially.

**Milk.** Milk standard, 3 per cent fat, 8 per cent solids not fat. *Cream.*—Cream shall contain at least 18 per cent fat. *Skimmed milk.*—Skimmed milk shall be sold only from cans plainly marked. *Adulterated milk.*—Adulterated, skimmed, diseased, impure, etc., milk is defined as any below the standard; or which has been altered in any way; or is from cows diseased, near the time of parturition, or poorly cared for, or fed unwholesome foods; or has been exposed to infection by disease germs; or has borax or salicylic acid added to it to prevent souring, etc. It shall not be sold nor delivered as pure milk.

Persons selling milk from stores or wagons shall annually procure license from commissioner—fee, \$1 for each store or wagon.

Owners of dairies and milk venders shall annually report amount of business done on blanks furnished by the commissioner.

Cans used by milk purchasers shall have their capacity marked upon them.

**Butter.** Commissioner issues to manufacturers of creamery butter, and makes regulations for the use of, brands with suitable device and words "Washington Creamery Butter" and registered numbers of the factories, and these shall be used on wrapper and outside of every package, but not on any other than Washington creamery butter. Owners of creameries shall report annually on blanks furnished by the commissioner.

**Cheese.** Commissioner issues to cheese manufacturers, and makes regulations for the use of, stencils with words "Washington State Full Cream Cheese," and registered numbers of factories, and these shall be used only on full cream cheese (and packages for same) containing 30 per cent fat and made wholly from pure milk. *Skimmed cheese.*—Cheese containing from 15 to 30 per cent of butter fat shall be plainly marked "Skimmed cheese." The manufacture of cheese containing less than 15 per cent butter fat is prohibited. *Fancy cheese.*—Edam, Pineapple, Swiss, and other fancy cheese are not included in the above regulations. Owners of cheese factories shall report annually on blanks furnished by the commissioner.

**Imitation butter.** No article which is in imitation of pure yellow butter and is not made wholly from pure milk or cream, with or without harmless coloring matter, shall be manufactured, sold, or used in any public eating house,

or eleemosynary, or penal institution, etc.; but oleomargarine, free from color or other ingredient to make it look like butter, and made in such form and sold in such manner as will advise the consumer of its real character, is permitted and may be used in public eating places when signs are displayed. *Renovated butter*.—Process butter shall be plainly marked “Renovated butter.”

**Imitation cheese.** Any cheese not made wholly from pure milk or cream or skimmed milk, with salt, rennet, and harmless coloring matter, is prohibited.

**Miscellaneous.** (No law.)

**Pure food.** Any article of food or drink is deemed to be adulterated if any inferior or injurious substance has been added to it, if any valuable constituent has been removed, if it is an imitation of or sold as another article, if it is diseased or decomposed or (if milk) the product of a diseased animal, if it is colored to conceal inferiority, etc. With the exception of mixtures or compounds recognized as ordinary foods or parts of foods which shall be labeled with the names of their ingredients, and are not injurious to health, such articles are prohibited.

## WEST VIRGINIA.

**Milk.** *Skimmed milk*.—Skimmed milk may be used in the manufacture of cheese.

**Butter and cheese.** Salt, rennet, and harmless coloring matter are permitted in the manufacture of butter and cheese.

**Imitation butter and cheese.** Any substance in semblance of butter or cheese, and not made wholly from pure milk or cream, and packages containing such substances, shall be plainly marked; printed statements explaining the character of the substance must be given to consumers. *Oleomargarine*.—Oleomargarine and artificial and adulterated butter shall be colored pink.

**Miscellaneous.** (No law.)

**Pure food.** The adulteration of any article of food or drink is a misdemeanor.

## WISCONSIN.

**Dairy and food commissioner.** Dairy and food commissioner is appointed by the governor; term of office, two years; salary, \$2,500 per annum. He may appoint as assistant commissioner an expert on dairy products at a salary of \$1,600, a chemist at \$1,800, and a clerk at \$900 per annum; also an inspecting agent at \$3 per day. Authority extends to all foods, drinks, and drugs. County district attorneys shall assist in prosecutions and special counsel may be employed. Laboratory for analytical work is provided. Commissioner shall make biennial reports; governor may authorize him to assist at farmers' institutes, etc.

**Milk.** Milk standard, 3 per cent fat and pure. Milk for city trade must be produced from cows fed wholesome food and kept in clean stables; it must be handled in clean utensils. *Adulterated milk*.—The sale or delivery of milk or cream that contains any foreign substance as color or preservative (viscogen may be used if milk is labeled), or the product of cows that are diseased or improperly cared for or fed slops, is prohibited, and the sale or delivery of adulterated or unwholesome milk, or milk from cows near the time of parturition, as the pure article, is prohibited. Standard tests may be made for proving adulteration.

**Butter.** Use of boracic and salicylic acids and injurious antiseptics in the manufacture of butter are prohibited.

An account of daily operations must be kept in creameries. Milk or cream must not be used at factories for benefit of any person to whom it does not belong.

**Cheese.** Unlawful to use false brands on cheese. Stencil bearing suitable device and words "Wisconsin full cream cheese" and registered number of factory is issued by commissioner to any factory applying for use on bandages and packages of full cream cheese under regulations prescribed by the commissioner. *Skimmed cheese.*—Skimmed cheese must be 10 inches in diameter and 9 inches high.

Account of daily operations must be kept in cheese factories. Milk or cream shall not be used at factories for benefit of any person to whom it does not belong.

**Imitation butter.** Any article made partly or wholly out of any fat or oil, etc., not from pure milk or cream, and in imitation of yellow butter, is prohibited; but oleomargarine, free from color or other ingredient to make it look like butter, and made in such form and sold in such manner as will advise the consumer of its real character, is permitted. It shall not be sold as butter. All packages exposed for sale must be plainly marked "Oleomargarine;" signs must be displayed in selling places and on wagons. Hotels, etc., using it must notify guests. Use not permitted in charitable or penal institutions. *Renovated butter.*—Every package or parcel of butter which has been melted, renovated, and prepared in imitation of creamery butter shall be plainly marked "Renovated butter."

**Imitation cheese.** Manufacture or sale or use in charitable or penal institutions of cheese made from skimmed milk to which fat foreign to milk has been added is prohibited.

**Miscellaneous.** (No law.)

**Pure food.** Any article of food or drink shall be deemed adulterated if any injurious or inferior substance has been added to it; if any valuable ingredient has been removed; if it is an imitation of or sold as another article; if it is diseased, infected, decomposed; if it is colored to conceal inferiority, etc. With the exception of certain ordinary foods, which shall be plainly labeled, such articles are prohibited.

## WYOMING.

**Milk.** Milk is exempted from the list of articles that can not be sold on Sundays.

**Butter.** (No law.)

**Cheese.** (No law.)

**Imitation butter.** (No law.)

**Imitation cheese.** (No law.)

**Miscellaneous.** (No law.)

**Pure food.** The adulteration of any article of food or drink with fraudulent intent or sale of same or knowingly selling any unwholesome article of food or drink is a misdemeanor.

## CANADA.

**Milk.** *Deteriorated milk.*—Deteriorated milk, meaning that which is adulterated or partly skimmed, or milk which is tainted or from a diseased cow, shall not be sold to a cheese, butter, or condensed milk factory. Competent person may use lactometer or cream gauge or other proper test for inferior milk.

**Butter and cheese.** Every package of butter and cheese, and cheese itself, for export, shall be plainly marked "Canadian," "Canadien," or "Canada," and the mutilation of these marks, or their use on articles not made in Canada, is prohibited. No package containing butter or cheese shall be marked with the name of any month except the month in which the product was made. Butter or cheese made in a foreign country before being offered for sale must be branded with the name of the country where produced. *Skim cheese.*—All cheese made

from skimmed milk shall be marked "Skim-milk cheese," and packages containing same shall be similarly marked. It is unlawful to remove or deface these marks.

Any person engaged in the manufacture of butter or cheese may register with the minister of agriculture, upon giving certain information, and have a number for exclusive use on his products allotted to his factory or creamery.

**Imitation butter.** The manufacture of oleomargarine, or other substitute for butter, from any animal substance except milk, or the sale of same, is prohibited.

**Imitation cheese.** Cheese made from skimmed milk to which foreign fat has been added is prohibited.

**Miscellaneous.** The governor in council may make such regulations as he considers necessary to enforce the law regarding dairy products.



## FULL TEXTS OF DAIRY LAWS.

The dairy laws which were printed in 1898 in the Fourteenth Annual Report of the Bureau of Animal Industry and are now in force, are referred to below by title. Laws enacted since the report named was issued, and a few which were inadvertently omitted from that report, are given in full.

### UNITED STATES.

See Fourteenth Annual Report of the Bureau of Animal Industry, pages 556-563, for—

Forty-ninth Congress, Session I, 1886, chapter 840<sup>1</sup> (sections 1-21).—An act defining butter, also imposing a tax upon and regulating the manufacture, sale, importation, and exportation of oleomargarine. (Approved August 2, 1886.)

Fifty-first Congress, Session I, 1890, chapter 1244, sections 41 and 53.—An act to reduce the revenue and equalize duties on imports, and for other purposes. (Approved October 1, 1890.)

Fifty-fourth Congress, Session I, 1896, chapter 337 (sections 1-19).—An act defining cheese, and also imposing a tax upon and regulating the manufacture, sale, importation, and exportation of "filled cheese." (Approved June 6, 1896.)

Fifty-fifth Congress, Session I, chapter 11, schedule G, 236-239.—An act to provide revenue for the Government and to encourage the industries of the United States. (Approved July 24, 1897.)

### ALABAMA.

See Fourteenth Annual Report of the Bureau of Animal Industry, page 563, for—

Acts of 1894-95, No. 408 (sections 1 and 2).—An act to prevent deception in the manufacture and sale of imitation butter. (Approved February 18, 1895.)

### ARIZONA.

(No dairy laws.)

### ARKANSAS.

See Fourteenth Annual Report of the Bureau of Animal Industry, page 564, for—

Acts and resolutions of 1885, act 127 (sections 1-6).—An act to prevent deception in the sale and use of butter. (Approved April 2, 1885.)

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<sup>1</sup> A bill providing for reducing the tax on uncolored oleomargarine and increasing the tax on the article when colored to resemble butter, was before the last Congress and will be given early consideration in the next.

## CALIFORNIA.

See Fourteenth Annual Report of the Bureau of Animal Industry, pages 564-568, for—

Statutes of 1893, chapter 137<sup>1</sup> (section 1).—An act entitled an act to prevent the sale of short-weight rolls of butter. (Approved March 11, 1893.)

Statutes of 1897, chapter 76 (sections 1-7).—An act defining the different grades of cheese and for branding the same manufactured in the State of California. (Approved March 4, 1897.)

Statutes of 1897, chapter 75 (sections 1-19).—An act to prevent deception in the manufacture and sale of butter and cheese, to secure its enforcement, and to appropriate money therefor. (Approved March 4, 1897.)

### Recently enacted:

#### STATUTES OF 1899, CHAPTER 25.

AN ACT to prevent deception in the sale of process or renovated butter. (Became a law, under constitutional provision, without governor's approval, February 23, 1899.)

**Process or renovated butter to be labeled.** SECTION 1. No person or persons, firms or corporation, shall sell, or offer for sale, or have in his or their possession for sale, any butter manufactured by boiling, melting, deodorizing, or renovating, which is the product of stale, rancid, or decomposed butter, or by any other process whereby stale, rancid, or decomposed butter is manufactured to resemble or appear like creamery or dairy butter, unless the same is plainly stenciled or branded upon each and every package, barrel, firkin, tub, pail, square, or roll, in letters not less than one half inch in length, "process butter," or "renovated butter," in such a manner as the purchaser will be advised of the real character of such "process" or "renovated" butter.

SEC. 2. Whoever shall violate any of the provisions or sections of this act shall be deemed guilty of a misdemeanor.

**District attorney to prosecute.** SEC. 3. It shall be the duty of the district attorney of each and every county of this State, upon application, to attend to the prosecution in the name of the State of any action brought for the violation of any of the provisions of this act within his district.

**State dairy bureau to enforce.** SEC. 4. The State dairy bureau, by its agent and assistant agents, is hereby authorized and directed to enforce all of the provisions of this act. All fines and penalties for the violation of this act shall be paid to the agent or assistant agents of the State dairy bureau, and by said bureau paid to the State treasurer.

**Repealing clause.** SEC. 5. All acts and parts of acts inconsistent with the provisions of this act are hereby repealed.

**In effect.** SEC. 6. This act shall take effect on and after its passage.

#### STATUTES OF 1899, CHAPTER 136.<sup>2</sup>

AN ACT to provide for the inspection of dairies, factories of dairy products, and of dairy products as to their sanitary condition, and as to the health of stock; to prevent the sale of milk, and the products of milk drawn from diseased animals; to prevent the spread of infectious and contagious diseases common to stock, and to appropriate money therefor. (Approved March 22, 1899.)

**Sale of impure or diseased milk forbidden.** SECTION 1. No person or persons, firms or corporation, shall sell or offer for sale, or have in his or their possession for sale, any impure or unwholesome milk, or any article of food manufactured therefrom, or of any cream from the same, or milk drawn from cows, either fifteen days before or five days following parturition, or from cows fed on unwholesome food, or from cows affected with any disease of live stock, contagious, infectious, or otherwise capable of producing such pathological changes as will cause the products from said animals to become unwholesome for food.

<sup>1</sup> This act is said to be obsolete and violations of it disregarded.

<sup>2</sup> The principal difficulty in the way of the enforcement of this law is that a formal complaint must be made before the bureau has authority to act, according to opinion of attorney-general.

**Dairy bureau to make inspections.** SEC. 2. It shall be the duty of the State dairy bureau, by its general agent and assistant agents, from time to time, as may be required, upon complaint made to it of the existence of any disease among dairy stock, or of unsanitary conditions, as mentioned and referred to in this act, to inspect all the dairies and creameries in the state so complained of, and to carefully investigate the sanitary conditions of the same. Said bureau, **Cattle, horses, and hogs to be inspected.** by its agents and assistant agents, shall at the same time inspect all cattle, horses, and hogs, belonging, in use by, or appurtenant to such dairies and creameries, for infectious and contagious diseases, such as are enumerated in section one of this act; and after such inspection, if said agent or assistant agent believes, or has reason to believe, that any contagious or infectious disease exists among the stock inspected, he shall immediately notify the State veterinarian of the same, setting forth the facts of the case, and he shall forthwith act upon such report.

**Appointment of assistant agents.** SEC. 3. The State dairy bureau shall, and they are hereby directed to appoint, from time to time, as many assistant agents, not exceeding twenty, as in their judgment may be required to carry out the provisions of this act, and to fix their compensation, not to exceed four dollars per day while actually employed, exclusive of their actual and necessary expenses. Whenever competent assistant agents can be found in counties or districts where such inspection is to be made, the State dairy bureau, by its general agent, shall appoint an assistant agent as inspector, who is not an owner of nor interested in any dairy, subject to the approval of the bureau, and such appointment shall be entered on the minutes of the bureau; *provided*, that such assistant agent shall have had practical experience in the manufacture of dairy products and the care and handling of stock.

**Monthly reports from employees.** SEC. 4. All persons employed by the bureau to carry out the provisions of this act shall render, under oath, to the State dairy bureau, on or before the fifth day of each and every month, an itemized statement of the number of days they were actually employed during the preceding month; also, an itemized statement of their actual expenses, with receipted vouchers attached thereto, for all sums exceeding one dollar, excepting railroad fares.

**Diseased animals to be slaughtered.** SEC. 5. Whenever in the judgment of the State veterinarian it shall for the purposes of this act be necessary to slaughter any animal or animals reported to him by said agent or assistant agent, he shall certify his reasons therefor to the agent ordering such inspection. The agent or assistant agent shall notify the owner or owners, or the person or persons in charge of the animal or animals, of the decision of said State veterinary surgeon, and shall order the animal or animals specified in the veterinary surgeon's certificate to be slaughtered immediately. Any animal or animals so slaughtered shall not be sold or removed, but shall be destroyed at the expense of the owner or owners, or the person or persons in charge of such animal or animals, under the direction and supervision of the agent or assistant agent ordering the animal or animals slaughtered, as may be specified by the State veterinarian.

**Agents to indicate necessary improvements.** SEC. 6. Whenever the agent or assistant agents of the bureau inspects any dairy, creamery, or any other place where milk is produced, or where products are manufactured from the same, including barns, corrals, hog yards, and places used for stock purposes, and utensils used in dairies and creameries, and finds the same not in good sanitary condition, he shall direct in writing such changes to be made as will put the same in good sanitary condition. Such written directions shall be served on the owner or owners, or upon the person or persons having charge of the premises, giving the parties so notified thirty days to make such changes as directed. If such changes are not made within thirty days, the person or persons refusing or neglecting to make such changes as directed shall be deemed guilty of a misdemeanor, and upon conviction shall be punished as hereinafter prescribed.

**Suppression of contagious diseases.** SEC. 7. Whenever any infectious or contagious disease affecting dairy stock shall be brought into or break out in this State, the State dairy bureau, by its agent and assistant agents, shall take prompt measures to suppress the same, and to prevent such disease from spreading, and for that purpose shall immediately notify the State veterinarian, and he shall forthwith inspect the matters so reported and act thereon.

**Authority to inspect stock.** SEC. 8. The agent or assistant agents shall also have the power to require each and every person, firm or corpora-



tion, having any stock in his or their possession, or under his or their control, to drive the same into corrals or small inclosures, for the purpose of inspection. Said agent shall give at least twenty-four hours' notice to the parties, of the time he requires such stock to be corralled; *provided*, that where it is impracticable to corral stock on large stock ranges, the owner or the person or persons having control of the same shall go with the agent or send some person to point out the stock to be inspected.

**District attorney to prosecute.** SEC. 9. It shall be the duty of the district attorney of each and every county of this State, upon application of the agent or assistant agents of the State dairy bureau, to attend to the prosecution, in the name of the State, of any action brought for the violation of any of the provisions of this act, within his district.

**Violation a misdemeanor.** SEC. 10. Any person or persons, firms or corporations, refusing or neglecting to comply with or conform to the provisions of this act, when required to do so by the agent or assistant agents of the State dairy bureau, or who shall in any manner interfere with them in the performance of their duties under this act, shall be guilty of a misdemeanor. Whoever shall violate any of the provisions or sections of this act shall be guilty of a misdemeanor. All fines collected under the provisions of this act shall be paid to the agent of the State dairy bureau, and by said bureau paid into the State treasury.

**Annual report to contain statistical matter.** SEC. 11. For the purpose of obtaining accurate information regarding the dairy industries of the State, the dairy bureau shall annually require in writing from each owner or manager of a dairy, owning or controlling any dairy stock exceeding one dozen cows in number, a report showing location of dairy, number and breed of all dairy stock in use or appurtenant thereto, together with such other pertinent information as said bureau may require. Information thus obtained shall be embraced in the annual report of the dairy bureau.

**State dairy bureau to enforce.** SEC. 12. It shall be the duty of the State dairy bureau now provided by law, by its general agent, to enforce the provisions of this act. Such agent shall receive an additional salary of fifty dollars per month, payable out of the money appropriated for the enforcement of this act.

**Appropriation.** SEC. 13. There is hereby appropriated for the use of the State dairy bureau, in enforcing and carrying out the provisions of this act, out of any money in the State treasury not otherwise appropriated, the sum of one thousand dollars (\$1,000) for the remainder of the fiftieth fiscal year; three thousand seven hundred and fifty dollars (\$3,750) for the first six months of the fifty-first fiscal year; three thousand seven hundred and fifty dollars (\$3,750) for the last six months of the fifty-first fiscal year; and five thousand dollars (\$5,000) for the fifty-second fiscal year.

**Disbursements.** SEC. 14. All salaries, fees, costs, and expenses shall be drawn from the moneys so appropriated, and the State controller shall draw his warrant on the State treasury in favor of the person or persons entitled to the same; *provided*, that the State board of examiners are hereby specially prohibited from granting or allowing any deficiency to the State dairy bureau for the purposes of this act; *and provided further*, that in no event shall there be more agents or assistant agents employed, or expenses incurred under this act than the appropriations herein made will pay for the respective periods for which they are made.

**In effect.** SEC. 15. This act shall take effect immediately.

## COLORADO.

See Fourteenth Annual Report of the Bureau of Animal Industry, pages 568-570, for:

Laws of 1895, chapter 19 (sections 1-18).<sup>1</sup>—An act to create the office of State dairy commissioner and to define his duties; and to regulate the manufacture and sale of all products of the dairy and all imitations thereof; and to provide the penalty for violations thereof; and making appropriations therefor; and to repeal an act entitled "An act to regulate the manufacture and sale of oleomargarine, cre-

<sup>1</sup>Section 2 of this act provides for the employment of a practical chemist, but no appropriation is made for paying for such services, and private donations have to be depended upon.



ating the office of State dairy commissioner and defining his duties, and making appropriation therefor," approved April 12, 1893, and all acts and parts of acts inconsistent with the provisions of this act. (Approved April 1, 1895.)

### CONNECTICUT.

See Fourteenth Annual Report of the Bureau of Animal Industry, pages 570-574, for:

General statutes, revision of 1887, sections 2614-2619 and 2658-2664.<sup>1</sup>—Concerning imitation butter, appointment of dairy commissioner, and impure milk.

Public Acts 1897, chapter 145 (sections 1-3).—An act concerning the selling of tub butter. (Approved May 5, 1897.)

Public Acts 1895, chapter 235 (sections 1-10).—An act regulating the manufacture and sale of food products. (Approved June 26, 1895.) [See amendment following:]

#### Sections recently amended:

##### PUBLIC ACTS OF 1895, Chapter 235

**Connecticut Agricultural Experiment Station to make analyses.** SEC. 4. (As amended by section 1, chapter 22 of Public Acts of 1899.) The Connecticut Agricultural Experiment Station shall make analyses of food products on sale in Connecticut, or kept in Connecticut for export, to be sold without the State, suspected of being adulterated. Samples of food products for analysis shall be taken by the duly authorized agents of the station, or by the dairy commissioner or his deputy, at such times and places and to such an extent as in the judgment of the officers of said experiment station and of the dairy commissioner shall seem expedient. The dairy commissioner or his deputy shall have full access at all reasonable hours to any place wherein it is suspected that there is kept for sale or for export, as above specified, any article of food adulterated with any deleterious or foreign ingredient or ingredients, and said dairy commissioner or his deputy, upon tendering the market price of such article, may take from any person, firm, or corporation, samples of the same. The said experiment station may adopt or fix standards of purity, quality, or strength, when such standards are not specified by law.

**Powers of dairy commissioner.**

**Food standards.**

**Commissioner to be notified of adulteration.** SEC. 5. (As amended by section 1, chapter 22 of Public Acts of 1899.) Whenever said experiment station shall find by its analysis that adulterated food products have been on sale in the State, or kept in the State for export, for sale without the State, it shall forthwith transmit the facts so found to the dairy commissioner, who shall make complaint to the proper prosecuting officer, to the end that violators of the law relating to the adulteration of food products shall be prosecuted.

### DELAWARE.

See Fourteenth Annual Report of the Bureau of Animal Industry, pages 574-576, for:

Laws of 1887, chapter 231 (sections 1-4).—An act for the protection of the public health and to prevent adulteration of dairy products and fraud in the sale thereof. (Passed April 15, 1887.)

Laws of 1895, chapter 209 (sections 1-5).—An act to prevent deception in the manufacture and sale of imitation butter. (Passed May 8, 1895.)

### DISTRICT OF COLUMBIA.

See Fourteenth Annual Report of the Bureau of Animal Industry, pages 576-581, for:

Fifty-third Congress, Session III, chapter 164 (sections 1-15).—An act to regulate the sale of milk in the District of Columbia, and for other purposes. (Approved March 2, 1895.)<sup>2</sup>

<sup>1</sup>\$1,000 is appropriated for the expenses of the office of the dairy commissioner.

<sup>2</sup>The health officer's regulations in force under this act are dated July 31, 1897.

Forty-fifth Congress, Session III, chapter 22 (sections 1-3).—An act for the protection of dairymen, and to prevent deception in sales of butter and cheese in the District of Columbia. (Approved January 25, 1879.)

Fifty-fifth Congress, Session II, chapter 25 (sections 1-10).—An act relating to the adulteration of foods and drugs in the District of Columbia. (Approved February 17, 1898.)

## FLORIDA.

[The following Revised Statutes include the dairy law published in the Fourteenth Annual Report of the Bureau of Animal Industry (page 581), and other sections which might apply to dairy products:]

**Selling diseased provisions, whether for meat or drink; penalty.** SEC. 2659. Whoever knowingly sells any kinds of diseased, corrupted or unwholesome provisions, whether for meat or drink, without making the same fully known to the buyer, shall be punished by imprisonment not exceeding six months, or by fine not exceeding two hundred dollars.

**Adulteration of any substance intended for food; penalty.** SEC. 2660. Whoever fraudulently adulterates, for the purpose of sale, bread or any other substance intended for food, with any substance injurious to health, shall be punished by imprisonment not exceeding one year, or by fine not exceeding three hundred dollars; and the articles so adulterated shall be forfeited and destroyed under the direction of the court.

**Sale of spurious preparations as butter prohibited.** SEC. 2662. Whoever knowingly and willfully sells or causes to be sold as butter any spurious preparation purporting to be butter, whether known as oleomargarine, or by any other name, shall be punished by imprisonment not exceeding thirty days, or by fine not exceeding one hundred dollars.

**Use in hotels, etc., must be made known.** SEC. 2663. Any keeper of any hotel or boarding house who shall knowingly and willfully, without giving notice to guests at the table, supply oleomargarine or other spurious preparation purporting to be butter, for the use of guests, shall be subject to the same penalty.

## GEORGIA.

See Fourteenth Annual Report of the Bureau of Animal Industry, pages 581-583, for—

Acts of 1895, part 1, title 7, No. 207 (sections 1-14).—An act to regulate the sale of milk, butter, and cheese, and to prescribe penalties for the unlawful sale or offering for sale of any watered or adulterated or unwholesome milk, and imitations or adulterations of butter and cheese. (Approved December 16, 1895.)

## IDAHO.

See Fourteenth Annual Report of the Bureau of Animal Industry, page 583, for—

General Laws, 1884-85, page 61 (sections 1-2).—An act to prevent the sale of oleomargarine, butterine, mixtures imitating or adulterated butter. (Approved January 27, 1885.)

Revised Statutes of 1897, section 6918.—Concerning adulterated foods, etc.

## ILLINOIS.

See Fourteenth Annual Report of the Bureau of Animal Industry, pages 583-588, for—

Laws of 1879, page 111 (sections 1-7) (= Hurd's Revised Statutes, chapter 38, sections 9-9e).—An act to regulate the sale of milk and to provide penalties for the adulteration thereof. (Approved May 29, 1879.)

Laws of 1883, page 54 (sections 1-4) (= Revised Statutes, chapter 5, sections 29-32).—An act to require operators of butter and cheese factories on the cooperative plan to give bonds, and to prescribe penalties for the violation thereof. (Approved June 18, 1883.)

Laws of 1879, page 11 (sections 1-3) (= Revised Statutes, chapter 38, sections 39a-39c).—An act to prevent frauds in the manufacture and sale of butter and cheese. (Approved May 31, 1879.)

Laws of 1881, page 74 (sections 1 and 2) (= Revised Statutes, chapter 38, sections 9f, 9g).—An act to prevent the adulteration of butter and cheese, or the sale or disposal of the same, or the manufacture or sale of any article as a substitute for butter or cheese, or any article to be used as butter and cheese. (Approved June 1, 1881.)

Laws of 1881, page 75 (sections 1, 3-8) (= Revised Statutes, chapter 38, sections 9h-9o).—An act to prevent and punish the adulteration of articles of food, drink, and medicine, and the sale thereof when adulterated. (Approved June 1, 1881.)

Laws of 1897, page 3 (sections 1-11) (= Revised Statutes, chapter 38, sections 39d-39n).—An act to regulate the manufacture and sale of substitutes for butter. (Approved June 14, 1897.)

Laws of 1885, page 207 (sections 1 and 3) (= Revised Statutes, chapter 38, sections 104a-104c).—An act to protect the public from imposition in relation to canned or preserved food. (Approved June 27, 1885.)

Additional laws are as follows:

#### LAWS OF 1897, page 268.

AN ACT to fix the standard of analysis of milk. (Approved June 7, 1897.)

**Milk standard.** That the standard of analysis for milk in this State as to ingredients and proportions shall be water, eighty-eight per centum, milk solids, twelve per centum, and said milk solids shall contain not less than three per centum of butter fat.

When contracts are made for milk purchased within this State for delivery within or without this State no other standard shall be used except by special contract in writing.

#### LAWS OF 1899, page 368.

AN ACT to provide for the appointment of a State Food Commissioner and to define his powers and duties and fix his compensation, and to prohibit and prevent adulteration, fraud, and deception in the manufacture and sale of articles of food, and to repeal certain acts or parts of acts herein named. (Approved April 24, 1899.)

**Food commissioner; term, salary.** SECTION 1. That the office of State Food Commissioner for the State of Illinois is hereby created. Within thirty days after this act shall take effect such commissioner shall be appointed by the Governor, by and with the advice and consent of the Senate, and his term of office shall be for two (2) years from the date of his appointment and until his successor is appointed and qualified. Thereafter the term of office of the commissioner shall be for four years and until his successor is qualified. The salary of the commissioner shall be twenty-five hundred dollars (\$2,500) per annum and his necessary and actual expenses in the discharge of his official duties

**Assistant commissioners.** SEC. 2. Such commissioner may, with the advice and consent of the Governor, appoint two assistant commissioners, each of acknowledged standing, ability and integrity, one of whom shall be an expert in the matter of dairy products, and the other of whom shall be a practical and analytical chemist, who shall be known as the State analyst. The salaries of such assistants shall not exceed eighteen hundred dollars (\$1,800) each per annum and their necessary and actual expenses incurred in the discharge of their official duties. In case of the absence or inability of the State analyst to perform all the duties of his office, the commissioner may appoint some competent person to assist in the same temporarily.

**Appointment of inspectors.** SEC. 3. The food commissioner shall have authority to appoint necessary inspectors not exceeding six in number to assist in the work of the food commissioner, at such times and for such periods of time as may be required in the enforcement of the dairy and food laws of the State. Such inspectors shall have the same right of access to places to be inspected as the commissioner. The compensation of such inspectors shall be three dollars (\$3.00) per day for each day of actual service, and their necessary and actual expenses when so employed.



**Duty of commissioner.** SEC. 4. It shall be the duty of the commissioner to enforce all laws that now exist or that may hereafter be enacted in this State regarding the production, manufacture, or sale of dairy products, or the adulteration of any article of food, and personally or by his assistants to inspect any article of food made or offered for sale within this State, which he may, through himself or his assistants, suspect or have reason to believe to be impure, unhealthful, adulterated, or counterfeit, and to prosecute, or cause to be prosecuted, any person or persons, firm or firms, corporation or corporations, engaged in the manufacture or sale of any adulterated or counterfeit article or articles of food contrary to the laws of this State.

**Analysis of suspected articles.** SEC. 5. It shall be the duty of the food commissioner to carefully inquire into the quality of the dairy and food products, and the several articles which are foods or the necessary constituents of food which are manufactured for sale or sold or exposed or offered for sale in this State, and he may in a lawful manner procure samples of the same, and direct the State analyst to make due and careful examination of the same and report to the commissioner the results of the analysis of all or any such food or dairy products as are adulterated, impure or unwholesome, in contravention of the laws of this State, and it shall be the duty of the commissioner to make complaint against the manufacturer or vendor thereof in the proper county, and furnish the prosecuting attorney with the evidence thereon and thereof to obtain a conviction for the offense charged. The food commissioner or his assistants, or

**Powers of food commissioner.** any person by him duly appointed for that purpose, shall have power in the performance of their duties to enter any dairy, creamery, cheese factory, store, saleroom, warehouse (except bonded warehouses for the storage of distilled spirits), where goods are stored or exposed for sale, or place where they have reason to believe food is stored or offered for sale, and open any cask, tub, jar, bottle, or package containing or supposed to contain any article of food, and examine or cause to be examined the contents thereof, and take therefrom samples for analysis. The person making

**Taking samples.** such inspection shall take such sample of such article or product in the presence of at least one witness, and he shall, in the presence of such witness, mark or seal such sample and shall tender, at the time of taking, to the manufacturer or vendor of such product, or to the person having the custody of the same, the value thereof, but if the person from whom such sample is taken shall request him to do so, he shall at the same time, and in the presence of the person from whom such property is taken, securely seal up two samples of the article seized or taken, the one of which shall be for examination or analysis under the direction of the commissioner, and the other of which shall be delivered to the person from whom the article was taken. Any person who

**Penalty for hindrance.** shall obstruct the commissioner or any of his assistants by refusing to allow him entrance to any place which he desires to enter in the discharge of his official duty, or refuse to deliver to him a sample of any article of food made, sold, offered or exposed for sale by such person, when the same is requested, and when the value thereof is tendered, shall be guilty of a misdemeanor, punishable by a fine of not exceeding fifty (50) dollars for the first offense, and not exceeding five hundred (500) dollars or less than fifty dollars (\$50) for each subsequent offense.

**State's attorneys to assist.** SEC. 6. It shall be the duty of the State's attorney in any county of the State, when called upon by the commissioner or any of his assistants, to render any legal assistance in his power to execute the laws and to prosecute cases arising under provisions of this act.

**State board of health to furnish samples.** SEC. 7. The State board of health may submit to the commissioner or to any of his assistants samples of food or drink for examination or analysis, and shall receive special reports showing the result of such examination or analysis.

**Certificates of analysis forbidden.** SEC. 8. It shall be unlawful for the State analyst, while he holds his office, to furnish to any individual, firm or corporation any certificate as to the purity or excellence of any article manufactured or sold by them to be used as food or in the preparation of food.

**Payment of salaries and expenses.** SEC. 9. The salary of the commissioner shall be paid from the fund appropriated for the payment of the salaries of State officers, and his assistants shall be paid out of the State treasury from the same fund and in the same manner as the salaries of other employes of the State are paid, and their official expenses shall be paid at the end of each cal-



endar month upon bills duly itemized and approved by the Governor, and the amount necessary to pay such salaries and expenses is hereby appropriated.

**Chemical laboratory appropriation.** SEC. 10. The commissioner may, under the direction of the Governor, fit up a laboratory with sufficient apparatus for making the analysis contemplated in this act, and for such purpose the sum of fifteen hundred dollars (\$1,500), or so much thereof as may be necessary, is hereby appropriated; and for the purpose of providing materials, and for necessary expenses connected with the making of such analysis, there is also hereby appropriated so much money as may be necessary, not exceeding six hundred dollars (\$600) annually. The appropriation provided for in this section shall be drawn from the State treasury upon certified bills approved by the Governor.

**Annual report of commissioner.** SEC. 11. The commissioner shall make an annual report to the Governor on or before the first day of January in each year, which shall be printed and published. Such report shall cover the doings of his office for the preceding year and shall show, among other things, the number of factories, creameries and other places inspected, and by whom; the number of specimens of food articles analyzed and the State analyst's report upon each one when the analysis indicates the same to be contrary to law; the number of complaints entered against persons for violation of the laws relative to the adulteration of food; the number of convictions had and the amount of fines imposed therefor, together with such recommendations relative to the statutes in force as his experience may justify. The commissioner may also prepare,

**Monthly bulletin.** print and distribute [to] the newspapers of the State, and to such persons as may be interested, or may apply therefor, a monthly bulletin containing the results of inspections, the results of analysis made by the State analyst of articles of food offered by [for] sale contrary to law, with proper explanation of the same, and such other information as may come to him in his official capacity relating to the adulteration of food and drink products and of dairy products, so far as he may deem the same of benefit and advantage to the public; also a brief summary of all the work done during the month by the commissioner and his assistants in the enforcement of the laws of the State, but not more than ten thousand copies of each of such monthly bulletins shall be printed: *Provided*, the necessary printing shall be done by the State printer, and all expenses for stationery and printing shall be audited, and paid from the same fund and in the same manner as other State printing and stationery.

**Fines to State treasury.** All fines, penalties and costs recovered for violations of this act and other acts now enacted or hereafter to be enacted prohibiting or regulating the adulteration of foods, shall be paid into the State treasury to the credit of the general fund of the State.

**Manufacture or sale of adulterated food.** SEC. 12. No person shall, within this State, manufacture for sale, have in his possession with intent to sell, offer for sale, or sell, any article of food which is adulterated within the meaning of this act.

**Food defined.** SEC. 13. The term "food," as used herein, shall include all articles, whether simple, mixed or compound, used for food, candy, drink or condiment by man or domestic animals.

**Adulteration defined.** SEC. 14. An article shall be deemed to be adulterated within the meaning of this act:<sup>1</sup> *First*—If any substance or substances

<sup>1</sup> The State food commissioner has published the following rules:

All milk offered for sale must be from healthy cows of clean and wholesome character, unadulterated, free from preservative, and must contain not less than three per cent of butter-fat.

The use of the word "Cream" on condensed milk cans is deemed *prima facie* evidence of intent to commit fraud.

Condensed milk shall be made from milk containing at least the legal standard of three per cent butter-fat and evaporated to one-third or less of its original volume.

Condensed skim milk must be plainly labeled as such.

Imitation butter must not be marked and sold as "Creamery" or "Dairy," but each should be marked plainly with its own name, but must be branded "Imitation Butter."

Oleomargarine, butterine and imitation butter can be manufactured and sold under their appropriate names and color when appropriately labeled. Each tub, package or parcel shall have distinctly and durably painted, stamped or marked thereon the true and appropriate name of such substance in ordinary bold-faced capital letters, not less than five lines pica.

"Whole milk" cheese, commonly mis-called "full cream" cheese, must contain at least forty-eight per cent of fat to total solids.

Butter shall contain at least 80 per cent of fat.

"Coffee cream" shall contain at least 15 per cent of fat, and "whipping cream" at least 22 per cent.

Canned goods must be labeled with grade or quality of the goods and the name and address of the seller or manufacturer.

has or have been mixed with it so as to depreciate, lower or injuriously affect its quality, strength, or purity. *Second*—If any inferior or cheaper substance or substances has or have been substituted wholly or in part for the article. *Third*—If any valuable necessary constituent or ingredient has been wholly or in part abstracted from it. *Fourth*—If it be an imitation of and sold under the name of another article. *Fifth*—If it is mixed, colored, coated, polished or powdered, whereby damage or inferiority is concealed, or if by any means it is made to appear better or of greater value than it really is. *Sixth*—If it contains any added substance or ingredient which is poisonous or injurious to health. *Seventh*—If it consists wholly or in part of a decomposed, putrid, infected, tainted or rotten animal or vegetable substance or article, whether manufactured or not, or if it is the product of a diseased animal, or if of an animal that has died otherwise than by slaughter: *Provided*, that an article of food which does not contain any ingredient injurious to health, and in the case of mixtures or compounds, which may be now, or from time to time hereafter, known as articles of food under their own distinctive names, or which shall be labeled so as to plainly indicate that they are mixtures, combinations, compounds, or blends, and not included in definition fourth of this section, shall not be deemed to have been adulterated: *Provided further*, that all manufactured articles of food offered for sale shall be distinctly labeled, marked or branded with the name of the manufacturer and place of manufacture, or the name and address of the packer or dealer who sells same.

\* \* \* \* \*

**Canned goods.** SEC. 20. No packer or dealer in preserved or canned fruits and vegetables, or other articles of food, shall sell or offer for sale such canned or preserved fruits and vegetables or other articles of food, unless they shall be entirely free from substances or ingredients deleterious to health, and unless such articles bear a mark, stamp, brand, or label, bearing the name and address of the firm, person, or corporation that packs same, or dealer that sells same. All soaked or bleached goods or goods put up from products dried before canning, shall be plainly marked, branded, stamped, or labeled as such, with the words "soaked" or "bleached goods" in letters not less than two-line pica in size, showing the name of the article and the name and address of the packer or dealer who sells same.

\* \* \* \* \*

**False brands.** SEC. 23. Whoever shall falsely brand, mark, stencil, or label any article or product required by this act to be branded, marked, stenciled, or labeled, or shall remove, alter, deface, mutilate, obliterate, imitate, or counterfeit any brand, mark, stencil, or label so required, shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be punished by a fine of not less than twenty-five nor more than two hundred dollars and costs of prosecution, or by imprisonment in the county jail for not less than thirty days nor more than ninety days, or by both such fine and imprisonment, in the discretion of the court, for each and every offense.

**Taking orders deemed a sale.** SEC. 24. The taking of orders, or the making of agreements or contracts, by any person, firm, or corporation, or by any agent or representative thereof, for the future delivery of any of the articles, products, goods, wares, or merchandise embraced within the provisions of this act, shall be deemed a sale within the meaning of this act.

**Sample for analysis to be furnished.** SEC. 25. Every person manufacturing, offering, or exposing for sale or delivery, to a purchaser any article intended for food, shall furnish to any person or analyst or other officer or agent appointed hereunder who shall apply to him for the purpose, and shall tender him the value of the same, a sample sufficient for the analysis of any such article which is in his possession. Whoever hinders, obstructs, or in any way interferes with any inspector, analyst or other officer appointed hereunder in the performance of his duty, and whoever wilfully neglects or refuses to do any of the acts or things enjoined by this act, or in any way violates any of the provisions of this act, shall be guilty of a misdemeanor, and upon conviction shall, where no specific penalty is prescribed by this act, be punished by a fine not exceeding two hundred nor less than twenty-five dollars, or by imprisonment in the county jail for a period not exceeding ninety days, or by both such fine and imprisonment in the discretion of the court.

**Repeal.** SEC. 26. All acts and parts of acts inconsistent with this act, and section 6<sup>1</sup> of an act entitled "An act to prevent the adulteration of butter and cheese,

<sup>1</sup> The act named and referred to above has but two sections.

or the sale or disposal of the same, or the manufacture or sale of any article as a substitute for butter or cheese, or any article to be used as butter and cheese," approved June 1, 1881, be, and they are hereby, repealed.

**Penalties suspended.** SEC. 27. For the purpose of enabling dealers in products affected by this act to dispose of same without loss, it is hereby expressly provided that the penalties of this act, and prosecution under same, are suspended until the first day of July, 1900.

## INDIANA.

See Fourteenth Annual Report of the Bureau of Animal Industry, page 589, for—

Horner's Revised Statutes, 1897, sections 2071 and 2071a.—Concerning sale of adulterated and impure milk, butter and cheese, and oleomargarine.

Recently enacted:

### ACTS OF 1899. Chapter 121.<sup>1</sup>

**AN ACT** forbidding the manufacture, sale or offering for sale of any adulterated foods or drugs, defining foods and drugs, stating wherein adulteration of foods and drugs consist and defining the duties of the State Board of Health in relation to foods and drugs, their inspection, purity, adulteration, declaring penalties for the violation of the laws, rules, and ordinances concerning foods and drugs, also liquors used or intended for drink, repealing acts in conflict therewith. (S. 54. Approved February 28, 1899. In force April 28, 1899.)

**Adulterated food forbidden.** SECTION 1. That no person shall, within this State, manufacture for sale, offer for sale, or sell any drug or article of food which is adulterated within the meaning of this act. The term "drug" as used in this act, shall include all medicines for internal or external use, antiseptics, disinfectants, and cosmetics. The term "food" as used herein, shall include confectionery, condiments, and all articles used for food or drink by man. An article shall be deemed to be adulterated within the meaning of this act: (a) In case of drugs \* \* \* (b)

**Adulteration defined.** In the case of food, (1) if any substance or substances have been mixed with it, so as to reduce, or lower, or injuriously affect its quality or strength; (2) if any inferior or cheaper substance or substances have been substituted wholly or in part for it; (3) if any valuable constituent has been wholly or in part abstracted from it; (4) if it is an imitation of or sold under the name of another article; (5) if it consists wholly or in part of a diseased, decomposed, putrid, or rotten animal or vegetable substance, whether manufactured or not, or, in the case of milk, if it is the product of a diseased animal; (6) if it is colored, coated, polished, or powdered, whereby damage is concealed, or if it is made to appear better or of greater value than it really is; (7) if it contains any added poisonous ingredient, or any ingredient which may render it injurious to the health of the person consuming it. The provisions of this act shall not apply to mixtures or compounds recognized as ordinary articles of food or drink: *Provided*, That the same are not injurious to health, and are distinctly labeled as mixtures or compounds; and no prosecutions shall at any time be maintained under said act concerning any drug, the standard of strength of purity whereof has been raised since the issue of the last edition of the United States Pharmacopeia, unless and until such change of standard has been published throughout the State.

**State Board of Health to enforce.** SEC. 2. It shall be the duty of the State Board of Health to enforce the laws of the State governing food and drug adulteration; and the State Health Officer shall be the State inspector of foods and drugs. The State Board of Health shall take cognizance of the interests of the public health relating to the sale of drugs and foods, and the adulteration of the same, and shall make all necessary investigation and inquiries in reference thereto, and for these purposes the State, county, city, and town Health Officers shall be food and drug inspectors, subordinate to the State Board of Health. Within ninety days after the passage of this act, the

<sup>1</sup> This law is not strictly enforced because necessary appropriation for enforcement has not been made.



State Board of Health shall adopt such measures<sup>1</sup> as may be necessary to facilitate the enforcement hereof, and shall prepare rules and ordinances where and when necessary regulating minimum standards for foods and drugs, defining specific adulteration and declaring the proper methods of collecting and examining drugs and articles of food. Every person offering or exposing for sale or delivering to a purchaser any drug or article of food included in the provisions of this act, shall furnish to any analyst or other officer or agent appointed hereunder, who shall apply to him for the purpose and shall tender to him the value of the same, a sample sufficient for the purpose of the analysis of any such drug or article of food which is in his possession. Whoever hinders, obstructs, or in any way interferes with any inspector, analyst or other officer appointed hereunder in the performance of his duty, and whoever violates any of the provisions of this act, shall, upon conviction, be fined in any sum not exceeding \$100. Whoever fraudulently adulterates, for the purpose of sale, bread or any other substance intended for food with any substance injurious to health, or knowingly barter, gives away, sells or has in his possession with intent

<sup>1</sup> Rules of the Indiana State board of health, according to chapter 121, acts of 1899, establishing minimum standards and defining specific adulterations of foods and drugs. (Passed October 13, 1899.)

#### MILK.

RULE 1. Pure cow's milk shall have the following minimum composition: Fat, 3 per cent; solids, not fat, 9 per cent.

RULE 2. Water existing in cow's milk in excess of 88 per cent shall be an adulteration. Any coloring matter added for any purpose whatsoever shall be an adulteration. Any chemical antiseptic whatever added for any purpose whatsoever shall be an adulteration.

RULE 3. Milk sold or offered for human consumption that is taken from a cow that has calved within four (4) days, or from a cow that will come in or calve inside of twenty-one (21) days, is polluted, and shall be considered as adulterated.

RULE 4. Milk sold or offered for human consumption that is taken from a cow fed with damaged food, or any food which will impart a disagreeable flavor, is impure, and shall be considered as adulterated.

RULE 5. Milk sold or offered for human consumption that is taken from any sick or diseased cow, or any cow that is given polluted water to drink, or which is kept under conditions contrary to the rules of the State board of health governing dairies, is impure, and shall be considered as adulterated.

#### BUTTER.

RULE 6. The word "butter" shall mean the substance usually known as butter, made exclusively from milk or cream, with or without salt or coloring matter, and shall contain not less than 80 per cent of pure milk fats.

RULE 7. If any of the following-named substances are found in butter, they shall be considered adulterants: Water in excess of 15 per cent; salt in excess of 6 per cent; salicylic acid, borax, boric acid, saltpeter, formaldehyde, glucose, sodium carbonate or bicarbonate, or any other added chemical, or any other fat than butter fat, any other coloring matter than is natural to butter, except annatto, saffron, safflower, turmeric, and harmless coal-tar colors.

#### MARGARINE.

RULE 8. The word "margarine" shall mean all substances, whether compounds or otherwise, prepared in imitation of butter, and whether mixed with butter or not.

RULE 9. If any of the following named substances are found in "margarine" they shall be considered adulterants: Water in excess of 15 per cent; salt in excess of 6 per cent; glucose, paraffin, salicylic acid, borax, boric acid, saltpeter, formaldehyde, sodium carbonate or bicarbonate, or any chemical preservative. Any coloring matter or mixture of coloring matters other than annatto, saffron, safflower, and turmeric and other harmless vegetable colors, and the harmless coal-tar colors shall be considered adulterants.

#### CHEESE.

RULE 10. Cheese not made wholly from milk or cream, salt, and harmless coloring matter shall be considered adulterated.

RULE 11. Cheese containing less than 10 per cent of milk fats shall be considered adulterated unless plainly labeled "Skim-milk cheese" in letters not less than 1 inch long, the label to be plainly exposed.

RULE 12. Cheese containing any other fats than milk fats shall be considered adulterated unless plainly labeled "Filled cheese."

RULE 13. Cheese containing any coloring matter other than annatto, safflower, saffron, turmeric, or harmless coal-tar colors shall be considered as adulterated.

RULE 14. Cheese containing any chemical antiseptic other than common salt shall be considered as adulterated, unless plainly labeled with the name of the antiseptic it contains.

\* \* \* \* \*

RULE 31. Food inspectors, when securing samples of food or drugs for analysis, shall, if the quantity procured be sufficient in amount, divide said sample into three equal parts, marking each one with date of collection, name and residence of vender, name and residence of inspector, and shall number the several portions 1, 2, 3. No. 1 shall be left with the vender, No. 2 retained by the inspector, and No. 3 reserved for or sent to the chemist selected to make the analysis. All these samples or portions shall be so sealed as to show upon sight any breaking of said seal.

RULE 32. Whoever violates any of the provisions of these rules shall, upon conviction, be fined in any sum not exceeding \$100, as is provided in section 2, Chapter CXXI, of an act approved February 23, 1899.



to sell any substance injurious to health, shall be fined in any sum not exceeding \$100, and the article so adulterated shall be forfeited and destroyed under the direction of the court. Whoever adulterates, for the purpose of sale, liquor used or intended for drink, and whoever knowingly sells any such liquor so adulterated, shall be punished by fine of not less than one hundred nor more than five hundred dollars, and the article so adulterated shall be forfeited, and destroyed according to the order of the court.

**Repeal.** SEC. 3. All acts and parts of acts in conflict with the provisions of this statute are hereby repealed.

## IOWA.

See Fourteenth Annual Report of the Bureau of Animal Industry, pages 589-592, for—

Code of 1897, title 12, chapter 13, sections 2515-2528.<sup>1</sup>—Concerning dairy commissioner, testing apparatus, imitation butter and cheese, dairy premises, milk tests, permits to sell milk, appropriation, etc.

Code of 1897, title 24, chapter 10, sections 4989-4991.—Concerning milk standard, care of cows, skimmed-milk cheese, adulteration, etc.

## KANSAS.

See Fourteenth Annual Report of the Bureau of Animal Industry, pages 593-594, for—

General statutes, 1897, volume 2, sections 322-325, 327-331.—Concerning impure milk and adulteration of food.

## KENTUCKY.

See Fourteenth Annual Report of the Bureau of Animal Industry, pages 594 and 595, for—

Acts of 1891, 1892, and 1893, chapter 182, sections 144 and 151.—Concerning adulterated milk and false brands. (Approved April 10, 1893.)

Acts of 1898, chapter 52 (sections 1-11).—An act regulating the manufacture and sale of food.

## LOUISIANA.

See Fourteenth Annual Report of the Bureau of Animal Industry, page 596, for—

Acts of 1886, No. 81 (sections 1-3).—An act to prohibit the sale in this State of oleomargarine, butterine, or other substances as butter, and to provide a penalty for the violation of the same. (Approved July 8, 1886.)

The following also refers to dairy products:

### ACTS OF 1882, No. 82.

AN ACT to define and punish adulteration of drugs, food and drink, providing for stamping articles manufactured, sold or offered for sale within this State, and prescribing punishment for its violation, and prescribing certain duties of the Board of Health relative to samples, and their analysis and fees therefor. (Approved July 5, 1882.)

**Adulterated foods and drugs prohibited; penalty.** SECTION 1. No person shall, within this State, manufacture, have, offer for sale, or sell any article of food or drugs which is adulterated, and any person violating this provision shall be deemed guilty of a misdemeanor, and upon conviction shall be punished by a fine not exceeding fifty dollars for the first offense, and not exceeding one hundred dollars for each subsequent offense.

**Adulteration defined.** SEC. 2. An article shall be deemed adulterated within the meaning of this act, in the case of drugs \* \* \* and in the

<sup>1</sup> The appropriation named in section 2528 is now \$4,000, in addition to the salary of the commissioner.

case of food or drink, if any substance has been mixed with it, so as to lower or injuriously affect its quality or strength, or if any inferior or cheaper substance or substances have been substituted wholly or in part for the pure article, or to mix any substance in food or drink so sold, or to sell the same so mixed, which by its use will affect in any extent the public health or injure the health of the consumer of said food or drink.

**Wholesale packages of groceries, etc., to be stamped.** SEC. 3. No person shall manufacture, sell, or offer for sale within this State, any drugs, groceries, such as sugar, coffee, tea, butter, cheese, or any other article to be consumed as food or drink, unless the package when sold at wholesale or the package from which it is taken, when sold at retail be stamped in plain large letters, showing the true quality and kind of the articles sold within the meaning of this act, and every person violating the provisions of this section shall be deemed guilty of a misdemeanor, and shall upon conviction pay a fine of not less than twenty-five dollars, nor more than fifty dollars, or be sentenced to imprisonment for not more than ten days or both at the discretion of the court.

**False labels; penalty.** SEC. 4. That any person who knowingly sells any article of food or drink with a stamp as provided aforesaid, and the article so sold is not the article it purports to be, or inferior quality, shall be deemed guilty of a misdemeanor, and upon conviction shall pay a fine not exceeding one hundred dollars.

**State Board of Health to examine foods and publish results.** SEC. 5. The State Board of Health shall take cognizance of the interests of the public health as it relates to the sale of food and drugs, and the adulteration of the same, and make all necessary investigations and inquiries relative thereto; and at any time, when in their judgment necessary, they shall chemically analyze any drug or drugs, articles of food and drink, and shall publish the results of their analysis together with the name of the article or articles analyzed, in case the same be deleterious to the public health, and to warn the public against its consumption. On application of any citizen, they shall also analyze the article or articles presented for analysis by him; but in this case he shall pay such fees, for said analysis, as the Board of Health may fix.

**Samples for analysis to be furnished.** SEC. 6. On application of the Board of Health through the officer to be selected by them, every person manufacturing or selling any article of food or drugs, shall be bound to furnish a sample of the said articles so manufactured, or sold to the said Board, sufficient in quantity to serve the purpose of analysis, under a penalty of not more than twenty dollars, to be recovered before any court of competent jurisdiction.

**In effect.** SEC. 7. That this act shall take effect sixty days after the promulgation thereof.

## MAINE.

See Fourteenth Annual Report of the Bureau of Animal Industry, pages 596-598, for—

Revised Statutes of 1883, chapter 38, sections 44-47.—Concerning milk inspectors; adulterated milk, and milk measures.

Public Laws of 1895, chapter 144 (one section).—An act relating to health and boards of health. (Approved March 26, 1895.)

Public Laws of 1895, chapter 169 (sections 1-5).—An act for the protection of dairymen. (Approved March 27, 1895.)

Revised Statutes of 1883, chapter 128, sections 3-6.—Concerning sale of imitations of butter and cheese.

## MARYLAND.

See Fourteenth Annual Report of the Bureau of Animal Industry, pages 958-601 for—

Laws of 1890, chapter 604 (= sections 48, 49, 51-57 of article 43 of Code of Public General Laws).—An act to add additional sections to article forty-three of the Code of Public General Laws, title "Health," to be numbered "sections forty-eight, forty-nine, fifty, fifty-one, fifty-two, fifty-three, fifty-four, fifty-five, fifty-six, and fifty-seven," so as to provide for the prevention of the adulteration

of articles of food and drink and the sale thereof when adulterated or unwholesome. (Approved April 8, 1890.)

Laws of 1894, chapter 53 (sections 1 and 2).—An act to authorize the mayor and city council of Baltimore to provide for the inspection and regulation of the sale of milk or any or all other food products offered for sale in the city of Baltimore, or intended for consumption therein. (Approved March 7, 1894.)

[Public General Laws, 1888, article 27, sections 88–91, were repealed and reenacted, amended, as below.]

### Recently enacted:

LAWS OF 1898, Chapter 306, p. 871.

AN ACT to add certain new sections to Article 58 of the Code of Public General Laws, title "Live Stock," under the new sub-title "Dairies," to follow Section 18 in proper numerical order. (Approved April 9, 1898.)

New sections added to Article 58 of Code of Public General Laws. SECTION 1. That certain new sections be and the same are hereby added to Article 58 of the Code of Public General Laws, title "Live Stock," under the new sub-title "Dairies," to follow section 18 of said Article in proper numerical order, and to read as follows:

Cattle to be registered. 19. It shall be the duty of all dairymen or herdsmen or private individuals supplying milk to cities, towns and villages to register their herds or cattle with the Live Stock Sanitary Board, in violation of which the parties offending shall be fined not less than \$1 nor more than \$20 for each offence.

Dairy premises to be inspected. 20. It shall be the duty of the Live Stock Sanitary Board, to have inspected at least annually, without notice to the owner or those in charge of any dairy or parties supplying milk, as named in section 19 of this article, the premises wherein cows are kept, and if such premises are found in any unsanitary condition, the said board may prohibit the sale and shipment of milk from such premises until such time as the premises shall conform to the following sanitary rules:

Construction of stables. RULE 1. No building or shed shall be used for stabling cows for dairy purposes, which is not well lighted and well ventilated, and which is not provided with sufficient feed trough or box, and suitable floor, laid with proper grades and channels to immediately carry off all drainage; and if a public sewer abuts the premises upon which such building is situated, they shall be connected therewith whenever the inspector considers such sewer connection necessary.

Unsanitary conditions not permitted. RULE 2. No water-closet, privy, cesspool, urinal, inhabited room or work-shop shall be located within any building or shed used for stabling cows for dairy purposes or for the storage of milk or cream; nor shall any fowl, hog, sheep, or goat be kept in any room used for such purposes.

Cleanliness; whitewash. RULE 3. It shall be the duty of each person using any premises for keeping cows for dairy purposes, to keep such premises thoroughly clean and in good repair and well painted or whitewashed at all times.

Buildings to be kept clean. RULE 4. It shall be the duty of each person using any premises for keeping cows for dairy purposes, to cause the building in which the cows are kept to be thoroughly cleaned, and remove all dung from the premises so as to prevent its accumulation in great quantities.

Milk vessels; care. RULE 5. Any person using any premises for keeping cows for dairy purposes, shall provide and use a sufficient number of receptacles, made of nonabsorbent materials for the reception, storage and delivery of milk, and shall cause them at all times to be cleaned and purified, and shall cause all milk to be removed without delay from the rooms in which cows are kept.

Care of cows. RULE 6. Every person keeping cows for the production of milk for sale shall cause every such cow to be cleaned every day, and to be properly fed and watered with abundance of pure, clean water.

Inclosures to be drained. RULE 7. Any inclosure in which cows are kept shall be graded and drained, so as to keep the surface reasonably



dry; no garbage, fecal matter, or similar matter shall be placed or allowed to remain in such inclosure unless sufficient straw or similar good absorbent materials be used to keep the inclosure clean at all times, and no open drains shall be allowed to run through it.

**Penalty.** And any person who shall ship or sell milk contrary to the aforesaid order of said board shall be deemed guilty of a misdemeanor, and upon conviction shall be fined not less than one dollar nor more than twenty dollars for each day during which shipments shall be made after notice of such order.

**Certificates of health for cattle.** 21. The Live Stock Sanitary Board shall, at the request of the owner or owners of dairy herds, furnish them with a certificate of health whenever the provisions of this article are complied with, and there is no visible sign of disease amongst such herd, such certificates shall be revocable in the discretion of the Board.

**Appropriation.** 22. For the purpose of paying the expenses required in carrying out the provisions of this sub-title, the sum of three thousand dollars is here appropriated annually, or so much thereof as is necessary out of the moneys in the treasury not otherwise appropriated, and the Comptroller is authorized and directed to draw his warrant on the treasury for such sum as the said board shall produce vouchers for, not exceeding the amount appropriated, payable monthly.

**In effect.** SEC. 2. That this Act shall take effect from the date of its passage.

#### LAWS OF 1900, Chapter 496.

AN ACT to repeal sections 88, 89, 90 and 91 of article 27 Code of Public General Laws—title, "Crimes and Punishments;" subtitle, "Frauds—Butter—Oleomargarine"—and to reenact the same with amendments, so as to read as follows: (Approved April 7, 1900.)

**Repeal.** SECTION 1. That Sections 88, 89, 90 and 91 of Article 27 Code of Public General Laws, title,—"Crimes and Punishments", sub-title, "Frauds—Butter—Oleomargarine" be and the same are hereby repealed and reenacted, so as to read as follows:

**Imitations of butter prohibited.** SEC. 88. That no person by himself, his agents or servants, or as the agent or servant of any other person, shall render or manufacture, sell or exchange, offer for sale or exchange, expose for sale or exchange, take orders for the future delivery of, have in his possession, keep in storage, distribute, deliver, transfer, or convey with intent to sell within this State, any article, product, or compound made wholly or partly out of any fat, oil, or oleaginous substance or compound thereof not produced directly and wholly from unadulterated milk or cream from the same, which shall be in imitation or semblance of yellow butter produced from pure unadulterated milk or cream from the same; *provided*, that nothing in this act shall be construed to prohibit the manufacture or sale of oleomargarine in a separate form, and in such manner as will advise the purchaser and consumer of its real character free from coloration or ingredient which causes it to look like yellow butter. Whoever violates any of the provisions of this section, shall be guilty of a misdemeanor, and shall be punished by a fine of not less than one hundred dollars nor more than three hundred dollars for the first offense, and by a fine of not less than two hundred nor more than five hundred dollars or by such fine and three months imprisonment for each subsequent offense.

**Placards where oleomargarine is sold.** SEC. 89. That whoever sells oleomargarine free from coloration or any ingredient that causes it to look like yellow butter, as provided in the previous section from any dwelling, store, office, or public market shall have conspicuously posted therein a placard or sign in plain Roman letters not less than four inches in length "Oleomargarine Sold Here." Any person neglecting or failing to post the placard herein provided for, shall be guilty of a misdemeanor and shall be punished by a fine of not less than one hundred dollars, nor more than three hundred dollars for the first offense, and one hundred dollars for each day neglect so to post or placard thereafter, and by a fine of not less than two hundred dollars nor more than five hundred dollars, or by such fine and three months imprisonment for each subsequent offense.

**Sale of imitation as butter; penalty.** SEC. 90. That whoever by himself, or his servants or agents, or as the servant or agent of any other person, sells or offers for sale to any person who asks, sends, or inquires for butter, any oleomargarine, butterine, or any substance made in imitation or semblance of butter, not made entirely of milk, or cream from the milk, of cows, with or



without coloring matter, shall be guilty of fraud and shall be punished by fine of one hundred dollars for the first offense, and by imprisonment of three months for each subsequent offense.

**Use of imitations in eating places, hospitals, etc.** SEC. 91. That no person by himself, his servants or agents, or as the servant or agent of any other person, shall serve to patrons, guests, boarders, or inmates of any hotel, eating house, restaurant, café, or any place of public entertainment or boarding house or public or private hospital, asylum, school, or penal institution, or help employed therein, any article or substance made in violation of the provisions of section 88 of this act, or any food made of the same or cooked in the same. Whoever by himself, his servants or agents, serves to any patron or guest or boarder, or inmate of any hotel, eating house, restaurant, café, or any place of public entertainment, or boarding house, or public or private hospital, asylum, school, or penal institution or help employed therein, oleomargarine free from coloration or any ingredient to make it look like yellow butter as provided in section 88 of this act, in the place or stead of butter, shall orally notify said guests, patrons, inmate, or help that the substance so furnished is not butter, and shall in addition conspicuously display at all times on each and every side of the room where the same is served a sign in plain Roman letters not less than four inches in length "Oleomargarine Used and Served Here." Any person violating the provisions of this section by neglecting or failing to give the oral notice and keeping the signs conspicuously posted on the walls of the room where the meals are served shall be guilty of a misdemeanor, and shall be punished by a fine of fifty dollars for the first offense, and by a fine of one hundred dollars, and imprisonment of one month for each subsequent offense.

**Penalty.** SEC. 2. That all laws or parts of laws inconsistent with this act shall be, and the same are hereby, repealed.

**Indictments to be prosecuted.** SEC. 3. That all indictments under the act of 1888, chap. 312, codified as sec. 88, 89, 90, and 91 of Article XXVII, shall be prosecuted as though the same were not repealed.

**In effect.** SEC. 4. That this law shall take effect from the date of its passage.

## MASSACHUSETTS.

See Fourteenth Annual Report of Bureau of Animal Industry, pp. 601-608, for—

Acts of 1891, chapter 412, sections 6-11.<sup>1</sup>—Concerning Dairy Bureau. (June 11, 1891.)

Public Statutes, chapter 57<sup>2</sup> (sections 1-11).—Concerning milk, licenses, and inspectors. [Section 9 of this act has been amended as below.]

Acts of 1885, chapter 352, section 8.—Concerning skimmed milk. (June 18, 1885.)

Acts of 1886, chapter 318, sections 3 and 4.—Concerning sealed samples. (In effect June 23, 1886.)

Acts of 1894, chapter 425 (one section).—Concerning samples. (May 22, 1894.)

Acts of 1896, chapter 264 (sections 1-3).—Concerning canned milk.

Public statutes, chapter 56, sections 17-21.—Concerning imitation butter and cheese and inspections.

Acts of 1886, chapter 317, sections 3-5.—Concerning dairy nomenclature and licenses for selling imitation butter, etc.

Acts of 1891, chapter 58<sup>3</sup> (secs. 1-3).—Concerning oleomargarine and inspections.

Acts of 1891, chapter 412 (secs. 1-5).—Concerning oleomargarine. (June 11, 1891.)

<sup>1</sup> Section 6 is repealed by chapter 368, acts of 1900, and a new section, which was not received in time for publication in this bulletin, provides for a general agent of the dairy bureau.

<sup>2</sup> By chapter 240, section 38, acts of 1899, the city board of health of Somerville is authorized to appoint its own milk inspectors. Sections 5 and 6, as amended by sections 1 and 2 of chapter 300, acts of 1900, were not received in time for publication in this bulletin—their wording and penalties have been slightly changed.

<sup>3</sup> Most of the prosecutions for selling oleomargarine illegally are under this act.

Acts of 1889, chapter 336 (one section).—Concerning feeding garbage to cows. (Approved May 9, 1889.)

Acts of 1882, chapter 263, section 6.—Concerning samples. (In effect May 26, 1882.)

### Recent amendment and enactments:

#### PUBLIC STATUTES, chapter 57.

**Milk standard.** SEC. 9 (as amended by section 6 of chapter 352 of the acts of the year 1885, and by section 2 of chapter 318 of the acts of the year 1886, and by section 2, chapter 398, acts of 1896 and by section 1, chapter 223, acts of 1899). In all prosecutions under this chapter, if the milk is shown upon analysis to contain less than thirteen per cent of milk solids, or to contain less than nine and three-tenths per cent of milk solids exclusive of fat, or to contain less than three and seven-tenths per cent of fat, it shall be deemed for the purposes of this act to be not of good standard quality, except during the months of April, May, June, July, August and September, when milk containing less than twelve per cent of milk solids, or less than nine per cent of milk solids exclusive of fat, or less than three per cent of fat, shall be deemed to be not of good standard quality.

#### ACTS OF 1899, chapter 169 (sections 1 and 2).

AN ACT relative to the inspection of milk. (Approved March 18, 1899.)

**Report of analysis.** SECTION 1. Whenever the State board of health, dairy bureau, or other State or city authority, obtains a sample of milk for inspection, by taking, purchase, or otherwise, the analysis of said sample shall within ten days of the procurement thereof, be sent to the person from whom the sample was obtained.

SEC. 2. This act shall take effect upon its passage.

#### ACTS OF 1899, chapter 340.

**Renovated butter to be labelled.** SECTION 1. Whoever, by himself or his agents, or as the servant or agent of any other person, sells, exposes for sale, or has in his custody or possession with intent to sell, any article or compound which is produced by taking original packing stock or other butter, or both, and melting the same, so that the butter fat can be drawn off, then mixing the said butter fat with skimmed milk, or milk, or cream, or other milk product, and rechurning the said mixture; or which is produced by any similar process and is commonly known as process butter, shall have the words "Renovated Butter" conspicuously stamped, labelled, or marked in a straight line in printed letters of plain, uncondensed Gothic type, not less than half an inch in length, so that said words can not easily be defaced, upon the top, side and bottom of every tub, firkin, box, or package containing said article or compound.

**Retail sales.** SEC. 2. In case of the retail sale of said article or compound not in the original package, the seller shall, by himself or his agents, attach to each package so sold, and shall deliver therewith to the purchaser, a label or wrapper bearing in a conspicuous place upon the outside of the package the words "Renovated Butter," in printed letters in a straight line of plain, uncondensed Gothic type, not less than half an inch in length.

**Penalty.** SEC. 3. Whoever violates any of the provisions of this act shall be punished by a fine of not less than one hundred dollars nor more than five hundred dollars, or by imprisonment in the house of correction for a term not exceeding one year.

### MICHIGAN.

See Fourteenth Annual Report of the Bureau of Animal Industry, pages 608-617, for—

Public Acts, 1893, No. 211 (sections 1-12).—An act to provide for the appointment of a dairy and food commissioner, and to define his powers and duties and fix his compensation. (Approved June 2, 1893.) [Sections 6, 7, 9, 11, and 12 of this act have been amended as below.]

Public acts, 1895, No. 193, sections 1-8 and 17-21.—An act to prohibit and prevent adulteration, fraud, and deception in the manufacture and sale of articles of food and drink. (Approved May 22, 1895.)

Public acts of 1873, No. 26 (one section) (= Howell's Annotated Statutes, 2244) (= Compiled Laws, vol. 3, page 3405).—An act to prevent and punish offenders for the adulteration of milk, and the products made therefrom, and to repeal an act entitled "An act to prevent the adulteration of milk, and to prevent the traffic in impure and unwholesome milk." approved March thirty-first, eighteen hundred and seventy-one. (Approved March 12, 1875.)

Public acts, 1887, No. 246 (sections 1-14) (= Howell's Annotated Statutes, 1690m-1690z) (= Compiled Laws, vol. 3, page 3406).—An act to prevent the sale of impure, unwholesome, adulterated, or swill milk in the State of Michigan, and to provide for inspectors. (Approved June 25, 1887.)

Public acts of 1891, No. 45 (sections 1 and 2).—An act to prohibit the use of oleomargarine, butterine, or any other substitute for butter in any of the public institutions of this State, and to provide the punishment therefor. (Approved April 29, 1891.)

[It is reported that the oleomargarine law printed below repeals the three following acts: Public acts of 1897, No. 76; public acts of 1887, No. 166 (= Howell's Annotated Statutes, 1690j); and public acts of 1881, No. 34 (= Howell's Annotated Statutes, 2245)].

## Recent amendments and enactments:

### PUBLIC ACTS OF 1893, No. 211.

**Duties of commissioner.** SEC. 6. (As amended by Act No. 245, Public Acts, 1895; and by Act No. 154, Public Acts, 1897; and by Act No. 268, Public Acts, 1899.) It shall be the duty of the Dairy and Food Commissioner to carefully inquire into the quality of the dairy and food and drink products, and the several articles which are foods or the necessary constituents of foods, which are manufactured or sold or exposed or offered for sale in this State, and he may in a lawful manner procure samples of the same and direct the State analyst to make due and careful examination of the same, and report to the commissioner the result of the analysis of all or any of such food and drink products or dairy products, as is adulterated, impure or unwholesome, in contravention of the laws of this State, and it shall be the duty of the commissioner to make complaint against the manufacturer or vender thereof, in the proper county, and furnish the evidence thereon and thereof to obtain a conviction of the offense charged. The Dairy and Food Commissioner, or his deputy, or any person by him duly appointed for that purpose, may make complaint and cause proceedings to be commenced against any person for the violation of any of the laws relative to adulterated, impure, or unwholesome food, and in such case he shall not be obliged to furnish security for costs; and shall have power in the performance of their duties to enter into any creamery, factory, store, salesroom, drug store, or laboratory, or place where they have reason to believe food or drink are [is] made, prepared, sold or offered for sale, and to open any cask, tub, jar, bottle, or package containing or supposed to contain any article of food or drink and examine or cause to be examined the contents thereof, and take therefrom samples for analysis. The person making such inspection shall take such sample of such article or product, in the presence of at least one witness, and he shall in the presence of such witness mark or seal such sample and shall tender at the time of taking to the manufacturer or vender of such product, or to the person having the custody of the same, the value thereof, and a statement in writing of the reason for taking such sample.

**Powers of officers.** SEC. 7. (As amended by Act No. 245, Public Acts, 1895; and by Act No. 268, Public Acts, 1899.) It shall be the duty of each prosecuting attorney when called upon, to render any legal assistance in his power, under the provisions of this act, or any subsequent act relative to the adulteration of food for the sale of impure or unwholesome food or food products.

**Prosecuting attorneys to assist.** SEC. 9. (As amended by Act No. 245, Public Acts, 1895; and by Act No. 154, Public Acts, 1897; and by Act No. 268, Public Acts, 1899.) The commissioner shall make an annual report to the Governor on or before the first day of July in each year, and which shall be printed and published on or before the first day of September next thereafter, which report shall cover the doings of his office for the preceding fiscal year which shall show, among other things, the number of manufacturies and other places inspected and by whom, the number of specimens of food articles analyzed, and the State analyst's

**Annual report; contents of.**



report upon each one: the number of complaints entered against persons for violation of the laws relative to the adulteration of food, the number of convictions had, and the amount of fines imposed therefor, together with such recommendations relative to the statutes in force as his experience may justify. The commissioner shall also prepare, print, and distribute to all the papers of the State, and to such persons as may be interested or may apply therefor, a monthly bulletin in suitable paper covers, containing results of inspections, the results of analyses made by the State analyst, with popular explanation of the same, and such other information as may come to him in his official capacity relating to the adulteration of food and drink products and of dairy products, so far as he may deem the same of benefit and advantage to the public; also a brief summary of all the work done during the month by the commissioner and his assistants in the enforcement of the laws of the State, but not more than ten thousand copies of each of such monthly bulletins shall be printed.

**Appropriation.** SEC. 11. (As added by Act No. 245, Public Acts, 1895; and amended by Act No. 154, Public Acts, 1897; and by Act No. 268, Public Acts, 1899.) There shall be appropriated each year the sum of eighteen thousand dollars, out of which shall be paid in such manner as other similar salaries, expenses, and accounts are allowed and paid, all the salaries and expenses provided for in this act: *Provided*, That all expenses for stationery and printing shall be audited and paid in the same manner as other State printing and stationery.

**Tax levy.** SEC. 12. (As added by Act No. 245, Public Acts, 1895; and amended by Act No. 154, Public Acts, 1897; and by Act No. 268, Public Acts, 1899.) The Auditor-General is hereby directed to annually add to and incorporate into the State tax, to be levied each year, the sum of eighteen thousand dollars, to be levied, assessed and collected as in case of other taxes for general purposes, upon all the property of the State, and when the tax is so levied and collected, the same shall be paid into and become a part of the general fund to reimburse such fund for the amounts appropriated to carry into effect the provisions of this act.

#### ACT No. 167, PUBLIC ACTS, 1899.

AN ACT in relation to the Powers and Duties of the Dairy and Food Commissioner of the State of Michigan.

**Misdemeanor to obstruct an official.** SECTION 1. That any person who shall obstruct the Dairy and Food Commissioner, or his deputy, or any of his duly appointed inspectors, by refusing to allow him entrance to any place where he is authorized to enter in the discharge of his official duty, or refuses to deliver to him a sufficient sample for the analysis of any article of food or drink sold, offered or exposed for sale, or in his possession for the purpose of sale, wherever the same may be found, when the same is requested and when the value thereof is tendered, shall be guilty of a misdemeanor, and upon conviction thereof shall be punished by a fine of not less than twenty-five dollars or more than one hundred dollars and the costs of prosecution, or by imprisonment in the county jail not less than ten days or more than ninety days, or by both such fine and imprisonment, in the discretion of the court, for each and every offense.

**In effect.** This act is ordered to take immediate effect.

#### ACT No. 106, PUBLIC ACTS, 1899.

AN ACT in relation to the sale and delivery of milk.

**Adulterated or preserved milk.** SECTION 1. No person shall offer or expose for sale, sell, exchange, or deliver, any milk to which water, chemicals, or preservatives, or any other foreign substance has been added. The term milk as used in this act shall include all skimmed milk, buttermilk, cream and milk in its natural state, as drawn from the cow.

**Penalty.** SEC. 2. Whoever shall do any of the acts or things prohibited, or neglects or refuses to do any of the acts or things enjoined by this act, or in any way violates any of its provisions, shall be deemed guilty of a misdemeanor, and shall be punished by a fine of not less than one dollar nor more than one hundred dollars and the costs of prosecution, or by imprisonment in the county jail not more than ninety days, or by both such fine and imprisonment, in the discretion of the court.

**In effect.** This act is ordered to take immediate effect.



## ACT No. 254, PUBLIC ACTS, 1899.

AN ACT to regulate the sale of butter produced by taking original packing stock and other butter and melting the same, so that the butter oil can be drawn off, mixed with skimmed milk or other material and by emulsion or other process produce butter, and butter produced by any similar process, and commonly known as "Process" Butter; Providing for the enforcement thereof, and punishment for the violation of the same. (In effect September 22, 1899.)

**Process butter must be labeled.** SECTION 1. That no person, firm or corporate body shall, within this State, sell, or offer or expose for sale, or have in his, her, or their possession with intent to sell, any butter not labeled in compliance with the provisions of this act. Butter produced by taking original packing stock and other butter and melting the same, so that the butter oil can be drawn off, mixed with skim milk or other material, and by emulsion or other process produce butter, and butter produced by any similar process, and commonly known as "Process" butter, shall before sale, and before being offered and exposed for sale, and while in the possession of any person, firm, or corporate body with intent to sell the same be plainly labeled "Process Butter," in the manner prescribed by this act. If sold, offered or exposed for sale, or in possession of any person, firm, or corporate body with intent to sell, the prints or rolls shall be covered by wrappers, on which shall be printed in conspicuous letters the words "Process Butter." If packed in tubs or other receptacles, and sold or offered or exposed for sale, or held in the possession of any person, firm, or corporate body with intent to sell the same, the said words shall be printed in one inch letters on the top and two sides of the tub or receptacle; if uncovered and not contained in a tub or other receptacle, and sold or offered or exposed for sale, or held in the possession of any person, firm, or corporate body with intent to sell the same, a placard containing the said words shall be attached to the mass, in a manner making them plain and prominent.

**Penalty.** SEC. 2. Every person, firm, or corporate body who shall violate any of the provisions of this act shall, for every such offense, forfeit and pay not less than twenty-five dollars nor more than one hundred dollars, which shall be recoverable with costs, including expense of inspection and analysis, by any person suing in the name of the People of the State of Michigan, as debts of like amount are by law recoverable: *Provided*, That the Dairy and Food Commissioner, together with the deputies, agents and assistants, shall be charged with the enforcement of this act, and shall have full access to all places of business, factories, buildings, carriages, cars, vessels, barrels, and packages of whatever kind, used in the manufacture and transportation and sale of any butter or any adulteration or imitation thereof. They shall also have power and authority to open any package, barrel, or vessel containing any butter, or any adulteration or imitation thereof, which may be manufactured, sold, or offered or exposed for sale, or held in possession with intent of the holder to sell; and they shall also have full power and authority to take the samples thereof for analysis, upon tendering the value of said samples. And all charges, accounts, and expenses of the department for the enforcement of this act, through the said commissioner, and his deputies, agents, assistants, chemists, and counsel employed by him in carrying out the provisions of this act, shall be paid by the treasurer of the State out of the appropriation for the support of the Dairy and Food Department.

**Commissioner and deputies to enforce; special powers.** charged with the enforcement of this act, and shall have full access to all places of business, factories, buildings, carriages, cars, vessels, barrels, and packages of whatever kind, used in the manufacture and transportation and sale of any butter or any adulteration or imitation thereof. They shall also have power and authority to open any package, barrel, or vessel containing any butter, or any adulteration or imitation thereof, which may be manufactured, sold, or offered or exposed for sale, or held in possession with intent of the holder to sell; and they shall also have full power and authority to take the samples thereof for analysis, upon tendering the value of said samples. And all charges, accounts, and expenses of the department for the enforcement of this act, through the said commissioner, and his deputies, agents, assistants, chemists, and counsel employed by him in carrying out the provisions of this act, shall be paid by the treasurer of the State out of the appropriation for the support of the Dairy and Food Department.

**Penalty.** SEC. 3. Every person who violates any of the provisions of this act shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be punished by a fine of not more than one hundred dollars, or by imprisonment in the county jail for not more than thirty days, or both fine and imprisonment, for the first offense; and a fine of one hundred dollars and imprisonment for thirty days, for every subsequent offense: *Provided*, That all fines and costs, including the expense of inspection and analysis imposed under this section, shall be covered into the State Treasury, as provided by section two of this act; and all butter sold or offered or exposed for sale, or held in the possession of anyone with intent to sell the same in violation of the provisions of this act shall be subject to forfeiture and spoliation.

**Justices of the peace to act.** SEC. 4. Justices of the peace throughout this State shall have jurisdiction to hear and determine actions arising for violations of the provisions of this act, and to hold for court or to impose the penalties imposed therein, subject to appeal as the law shall direct.

## ACT No. 147, PUBLIC ACTS, 1899.

AN ACT in relation to the manufacture and sale of oleomargarine or imitation butter.

**Oleomargarine to be labeled.** SECTION 1. No person shall sell, expose or offer for sale or exchange, or have in his possession with intent to sell or exchange, any oleomargarine or other substance made in imitation of butter, and which is intended to be used as a substitute for butter, unless each and every vessel, package, roll, or parcel of such substance has distinctly and durably printed, stamped, or stenciled thereon in black letters the true name of such substance, in ordinary bold-faced capital letters, not less than five-line pica in size; and also the name and address of the manufacturer, together with the name of each and every article or ingredient used or entering into the composition of such substance, in ordinary bold-faced letters, not less than pica in size.

**Verbal notice with sale.** SEC. 2. No person shall sell, exchange, or deliver any oleomargarine or other substance made in imitation of butter, and which is intended to be used as a substitute for butter, unless he shall distinctly inform the purchaser by a verbal notice at the time of the sale that the same is a substitute for butter, and shall also deliver to the purchaser of each and every roll, package, or parcel of such oleomargarine or other substance, at the time of the delivery of the same, a separate and distinct label, on which is plainly and legibly printed in black ink in ordinary bold-faced capital letters not less than five-line pica in size, the true name of such substance and also the name and address of the manufacturer, together with the name of each article used and entering into the composition of such substance, in ordinary bold-faced letters not less than pica in size.

**Placards in eating places and stores.** SEC. 3. The proprietor or keeper of any store, hotel, restaurant, eating saloon, boarding house, or other place where oleomargarine is sold or furnished to persons paying for the same, shall have placed on the walls of every store or room where oleomargarine is sold or furnished, a white placard on which is printed in black ink, in plain Roman letters of not less than three inches in length, and not less than two inches in width, the words "Oleomargarine Sold or Used Here," and shall at all times keep the same exposed in such conspicuous place as to be readily seen by any and all persons entering such store or other room or rooms.

**Dairy terms for oleomargarine forbidden.** SEC. 4. No person shall use in any way, in connection or association with the sale or exposure for sale or advertisement of any substance designed to be used as a substitute for butter, the word "Butter," "Creamery," or "Dairy," or the name or representation of any breed of dairy cattle, or any combination of such word or words and representation, or any other words or symbols or combinations thereof commonly used in the sale of butter.

**Butter defined.** SEC. 5. For the purpose of this act the word "butter" shall be understood to mean the food product usually known as butter, and which is made exclusively from milk or cream, or both, with or without common salt, and with or without additional coloring matter.

**Oleomargarine defined.** SEC. 6. For the purposes of this act certain manufactured substances, certain extracts, and certain mixtures and compounds, including such mixtures and compounds with butter, shall be known and designated as "Oleomargarine," namely: All substances heretofore known as oleomargarine, oleo, oleomargarine oil, butterine, lardine, suine, and neutral; all mixtures and compounds of oleomargarine, oleo, oleomargarine oil, butterine, lardine, suine, and neutral; all lard extracts and tallow extracts; and all mixtures and compounds of tallow, beef fat, suet, lard, lard oil, vegetable oil, butterine, lardine, suine and neutral; all lard extracts and tallow extracts; and all mixtures and compounds of tallow, beef fat, suet, lard, lard oil, vegetable oil, intestinal fat, and offal fat, made in imitation or semblance of butter, or, when so made, calculated or intended to be sold or used as butter or for butter.

**Penalty.** SEC. 7. Whoever violates any of the provisions of this act shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be punished by a fine of not less than fifty dollars, nor more than five hundred dollars, and the costs of prosecution, or by imprisonment in the county jail or State House of Correction and Reformatory at Ionia, for not less than six months nor more than three years, or by both such fine and imprisonment in the discretion of the court, in each and every offense. All acts or parts of acts inconsistent with the provisions of this act are hereby repealed.

**In effect.** This act is ordered to take immediate effect.

## MINNESOTA.

See Fourteenth Annual Report of the Bureau of Animal Industry, pages 622-623, for—

General Laws of 1887, chapter 141 (sections 1 and 2).—An act to prevent fraud in dairy products and to preserve health.

General Laws of 1895, chapter 202 (sections 1-5).—An act to preserve the public health by requiring dealers in certain cases to empty and wash cans, bottles, and vessels used in transporting milk or cream. (Approved April 25, 1895.)

General Laws of 1895, chapter 203 (sections 1-3).—An act relating to the inspection of milk and of dairies and dairy herds, and to provide for the licensing and regulation of the sale of milk in cities. (Approved April 26, 1895.)

[General Laws of 1885, chapter 149, as amended and supplemented by chapter 140, General Laws of 1887 and chapter 247, General Laws of 1889; and General Laws of 1891, chapter 11, have been superseded by General Laws of 1899, chapter 295, below.]

### Recently enacted:

#### GENERAL LAWS 1899, CHAPTER 295.

AN ACT to prevent fraud in the sale of dairy products, their imitations or substitutes, to prohibit and prevent the manufacture or sale of unhealthy or adulterated dairy products, and to preserve the public health. (Approved April 19, 1899.)

**State dairy and food commissioner; salary.** SECTION 1. The governor shall appoint a commissioner who shall be known as the State

Dairy and Food Commissioner, who shall be a citizen of this State, and who shall hold his office for a term of two years, or until his successor is appointed, and who shall receive a salary of \$1,800 per annum and his necessary expenses incurred in the discharge of the duties required of him by law, and shall be charged with the enforcement of the various laws coming under his department. It shall be

**Duty.** the duty of the said commissioner to enforce all laws that now exist or that hereafter may be enacted in this State regarding the production, manufacture, and sale of dairy products, their imitations and substitutes and food prepared therefrom, the production, manufacture, sale, or adulteration of which is made subject to this or other laws, and to prosecute or cause to be prosecuted any person, firm, or corporation or agent thereof, engaged in the manufacture or sale of any impure, adulterated, or counterfeit dairy products that are produced, offered for sale, or sold, contrary to the laws of this State. Said commissioner may be removed from office at the pleasure of the governor and a successor appointed in his stead.

**Other officers and salaries.** The said commissioner is hereby authorized and empowered to appoint a secretary, whose salary shall be \$1,200 per annum, one assistant commissioner, whose salary shall be \$1,500 per annum, one chemist, whose salary shall be \$1,500 per annum, one assistant chemist when needed, to be paid not to exceed \$100 per month, and such number of inspectors as may be by him be deemed necessary, to be paid at the rate of \$100 per month and the necessary expenses incurred in the performance of their duties, and to employ such counsel as may be deemed necessary. The sum of \$15,000 annually

**Appropriation.** is hereby appropriated to be paid for the execution of the dairy laws, out of any money in the State treasury not otherwise appropriated. All charges, accounts, and expenses authorized by this act shall be paid by the treasurer of the

**Biennial reports and bulletins.** State upon the warrant of the State auditor. The said

commissioner shall make biennial reports to the legislature not later than the fifteenth day of January of his work and proceedings, and shall report in detail the number of inspectors he has appointed and employed, with their expenses and disbursements, and the amount of salary paid the same, and he may from time to time issue bulletins of information, when in his judgment the interests of the State would be promoted thereby. The

**Office and laboratory.** said commissioner shall have rooms in the capitol, to be set apart for his use by the governor, and a laboratory in the capitol where all chemical analyses for the department shall be conducted. This section shall not affect the tenure of office of the present commissioner, and he shall be regarded as having been appointed under the provisions of this act.

**Powers of officers.** SEC. 2. The said commissioner and assistant commissioner and such inspectors, agents, experts, chemists, and counsel as they shall duly authorize for the purpose, shall have access, ingress, and egress to all places of business, factories, farms, buildings, carriages, and cars used in the man-



ufacture and sale or transport of any dairy product or any substitute therefor, or imitation thereof, and also into all restaurants, dining halls, cafes, hotels and all rooms thereof, and all other places wherein food is prepared, stored or served to patrons. They shall also have power and authority to open any package, can or vessel containing such article which may be manufactured, sold, or exposed for sale in violation of the provisions of this act, or laws that now exist or that may hereafter be enacted in this State, and may inspect the contents thereof, and may take samples therefrom for analysis. All dealers, clerks, bookkeepers, express agents, railroad officials, employes, or common carriers shall render to them all the assistance in their power when so required in tracing, finding, or discovering the presence of any article prohibited by law.

**Assistance to be given.** SEC. 3. Any refusal or neglect on the part of such dealers, clerks, bookkeepers, express agents, railroad officials, employes, or common carriers to render such friendly aid shall be deemed a misdemeanor and shall be punished as hereinafter provided.

**Failure to assist.** SEC. 4. No person, firm, or corporation shall offer or expose for sale, or sell or deliver for sale or consumption, or have in his possession with intent to sell, any unclean, impure, unhealthful, unwholesome, or adulterated milk or cream from the same, or any milk, or cream from the same, which has not been well cooled, aerated, or to which preservatives of any kind have been added.

**Impure milk prohibited.** SEC. 5. No person, firm, or corporation shall keep cows for the production of milk for market or for sale or exchange, or for manufacturing the same, or cream from the same, into articles of food, in a crowded condition, or in stables which are not perfectly ventilated or which are filthy from an accumulation of animal refuse or from any other cause. Nor shall milk for such purposes be drawn from cows which are themselves in a condition of filth or uncleanness, or from cows which are affected with tuberculosis, ulcers, running sores, or any other form of disease, or from cows which are fed, either wholly or in part, upon distillery waste, or brewery grains, or the waste of vinegar, or that of sugar factories, not properly preserved in silos, or upon any other form of food which will produce milk which is unhealthful or unwholesome; or from cows within fifteen days before and five days after parturition; and all milk thus produced is hereby declared to be unclean, impure, unhealthful, and unwholesome milk, and any milk which is shown by analysis to contain any substance or substances of any character whatever not natural or normal constituents of milk, or to have been deprived either wholly or in part of any constituent naturally or normally contained in milk or which is shown to contain more than eighty-seven per centum of water fluids or less than thirteen per centum of milk solids, of which not less than three and one-half per centum shall be fat, is hereby declared to be adulterated milk. This section shall not be construed to prevent the feeding of ensilage from silos. The having in possession by any person, firm or corporation producing milk for market or for sale or exchange, or for manufacturing the same, or cream from the same into articles of food, of distillery waste or brewery grains, or the waste of vinegar, or that of sugar factories not preserved as aforesaid, or any other form of food which will produce milk which is unhealthy or unwholesome, shall be considered for the purposes of this act as prima facie evidence of an intent to use the same contrary to the provisions of this act.

**Care of cows.** SEC. 6. No person, firm, or corporation shall manufacture or sell or deliver for sale or consumption, or have in his possession with intent to sell, any unclean, impure, unhealthful, or unwholesome milk, or of cream from the same, any article of food.

**Use of milk from unclean or affected cows.** SEC. 7. No person, firm, or corporation shall sell or offer for sale or have in his possession with intent to sell, any cream taken from impure, unwholesome, or diseased milk or cream that contains less than twenty per centum of fat.

**Addition of foreign matter.** SEC. 8. No person, firm, or corporation shall sell or expose for sale, or have in his possession, with intent to sell, in any store or place of business, or on any wagon or other vehicle used in transporting or selling milk from which cream has been removed, or milk commonly called "skimmed milk," without first marking the can, vessel, or package containing said milk with the words "skimmed milk," in large, plain, black letters upon a light-colored background, each letter being at least one inch high and one-half inch wide; said words shall be on the top or side of said can, vessel, or package where they can be easily seen.

**Milk standard.** SEC. 9. No person, firm, or corporation shall sell or expose for sale, or have in his possession, with intent to sell, in any store or place of business, or on any wagon or other vehicle used in transporting or selling milk from which cream has been removed, or milk commonly called "skimmed milk," without first marking the can, vessel, or package containing said milk with the words "skimmed milk," in large, plain, black letters upon a light-colored background, each letter being at least one inch high and one-half inch wide; said words shall be on the top or side of said can, vessel, or package where they can be easily seen.

**Manufacture of any food from unhealthy milk.** SEC. 10. No person, firm, or corporation shall manufacture from unclean, impure, unhealthful, or unwholesome milk, or of cream from the same, any article of food.

**Cream standard.** SEC. 11. No person, firm, or corporation shall sell or expose for sale, or have in his possession, with intent to sell, in any store or place of business, or on any wagon or other vehicle used in transporting or selling milk from which cream has been removed, or milk commonly called "skimmed milk," without first marking the can, vessel, or package containing said milk with the words "skimmed milk," in large, plain, black letters upon a light-colored background, each letter being at least one inch high and one-half inch wide; said words shall be on the top or side of said can, vessel, or package where they can be easily seen.

**Skim milk must be labeled.** SEC. 12. No person, firm, or corporation shall sell or expose for sale, or have in his possession, with intent to sell, in any store or place of business, or on any wagon or other vehicle used in transporting or selling milk from which cream has been removed, or milk commonly called "skimmed milk," without first marking the can, vessel, or package containing said milk with the words "skimmed milk," in large, plain, black letters upon a light-colored background, each letter being at least one inch high and one-half inch wide; said words shall be on the top or side of said can, vessel, or package where they can be easily seen.



**Standard apparatus for testing milk.** SEC. 9. The State standard milk measures or pipettes shall have for milk a capacity of seventeen and six-tenths cubic centimeters, and for cream shall have a capacity of eighteen cubic centimeters, and the State standard test tubes or bottles for milk shall have a capacity for two cubic centimeters of mercury at a temperature of sixty degrees Fahrenheit between "zero" and ten on the graduated scale marked on the necks thereof; and the standard test tubes or bottles for cream shall have a capacity of six cubic centimeters of mercury at a temperature of sixty degrees Fahrenheit between "zero" and thirty on the graduated scale marked on the necks thereof, and it is hereby made a misdemeanor to use any other size of milk measure, pipette, test tube, or bottle to determinate the per cent of butter fat, where milk or cream is purchased by, or furnished to, creameries or cheese factories, and where the value of said milk or cream is determined by the per cent of butter fat contained in the same. Any manufacturer, merchant, dealer, or agent in this State who shall offer for sale or sell, a cream or milk pipette or measure test tube or bottle which is not correctly marked or graduated as herein provided shall be guilty of a misdemeanor, and upon conviction thereof shall be punished as provided in section 30 of this act.

**False tests.** SEC. 10. It shall be unlawful for the owner, manager, agent or any employe of a creamery or cheese factory to manipulate or under-read the Babcock test, or any other contrivance used for determining the quality or value of milk.

**Sale or use of preservatives prohibited.** SEC. 11. No person, firm, or corporation shall manufacture for sale, advertise, offer or expose for sale, or sell, any mixture or compound intended for use as an adulterant of or preservative of milk, butter, or cheese, nor shall any person, firm, or corporation add to milk or butter or cheese, or during the process of their manufacture, any borax, boric acid, salicylic acid, formaldehyde, formalin, or any other substance or substances in the nature of adulterants, antiferments, or preservatives. *Provided*, however, that this section shall not apply to pure salt added to butter and cheese.

**Licenses to peddle milk.** SEC. 12. Whoever by himself or his agents conveys milk in carriages, carts, or other vehicles, or in any manner, for the purpose of selling the same, in any city or town of 1,000 inhabitants or more, shall annually on the first day of May, or within thirty days thereafter, be licensed by the State Dairy and Food Commissioner to sell milk within the limits of said city or town, and shall pay to the said State Dairy and Food Commissioner the sum of one dollar for each and every carriage, cart, or other vehicle thus employed, to the use of said dairy and food commissioner. Licenses shall be used only in the names of the owners of carriages, carts, or other vehicles, and shall for the purpose of this act be prima facie evidence of ownership. All licenses shall terminate on the first day of May of each and every year. No licenses shall be sold, assigned or transferred. Each license shall record the name, residence, place of business, number of carriages, carts, or other vehicles used (where more than one is employed), the name and residence of any driver, or other person engaged in selling or delivering said milk, the number of the carriage, cart, or other vehicle, where he has more than one, and the number of license.

**Requirements of licenses.** Each licensee shall, before engaging in the sale of milk, cause his name, the number of his license, and the number of the carriage, cart, or other vehicle, where he has more than one, and his place of business to be legibly placed on each outer side of all carriages, carts, or other vehicles used by him in the conveyance or sale of milk and he shall report to the State dairy and food commissioner any change of driver, or other person employed by him, which may occur during the term of his license. Any person keeping not more than one cow shall be exempted from the provisions of this section.

**Licenses to sell at stores, etc., required.** SEC. 13. Every person, firm, or corporation before selling milk or offering it for sale, or having it in his possession, with intent to sell in a store, booth, stand, creamery, cheese factory, or any other place, in the respective towns or cities, as designated in section 13 of this act, shall procure a license from the State Dairy and Food Commissioner, or his authorized agents, and shall pay therefor the sum of one dollar. Every such license shall terminate on the first day of May in each and every year. No license shall be sold or transferred.

**Disposal of adulterated milk.** SEC. 14. No person by himself or his agents or servants shall sell, supply, or bring to be manufactured, to any butter or cheese manufactory any milk diluted with water or any other substance

whatever, or any unclean, impure, unhealthy, adulterated, or unwholesome milk, or milk from which any cream has been taken (except pure skim milk to skim cheese factories), or shall keep back any part of the milk commonly known as "strippings," or shall bring or supply milk which is sour, to any butter or cheese manufactory (except pure skim milk to skim cheese factories). No butter or cheese manufactories except those which buy all the milk they use shall use for their own benefit or allow any of their employes

Use of milk for benefit of operators. or any other person to use any of the milk or cream brought to said manufactories, or the product thereof, without the consent of the owners thereof. Every butter and cheese manufacturer, except those who buy all the milk they use, shall keep a correct record of all

Record of operations of factories. the milk daily received, and of the number of pounds and packages of butter, the number and aggregate weight of cheese made each day, the number of packages of cheese and butter disposed of, which record shall be open to inspection to every person who delivers milk to such manufacturer.

Other articles not to be sold as butter or cheese. SEC. 15. No person by himself or his agents or servants shall manufacture for sale, have in his possession with intent to sell, offer or expose for sale, or sell as butter or as cheese any substance not the exclusive and legitimate product of milk or cream.

Imitations of butter and cheese prohibited. SEC. 16. No person by himself or his agents, or his agents or servants shall manufacture for sale, have in his possession with intent to sell, expose or offer for sale, or sell as butter or as cheese, or as substitutes for butter or cheese, or as imitations of butter or cheese, under any name or title whatsoever, any mixture or compound, which is designed to take the place of butter or of cheese, and which is made from animal or vegetable oils or fats, or by the mixing or compounding of the same, or any mixture or compound consisting in part of butter or of cheese in mixture or combination with animal or vegetable oils or fats, nor shall any person mix, compound with or add to milk, cream, butter, or cheese any animal or vegetable oils or fats, with design or intent to make or produce any article or substance in imitation of butter or cheese, nor shall any person coat, powder, or color with annatto or with any other coloring matter whatever, butterine, or oleomargarine or any mixture or compound of the same, or any article or compound made wholly or in part from animal or vegetable oils or fats not produced from milk or cream, whereby the said article or compound shall be made to resemble butter or cheese, nor shall any person offer or expose for sale or sell any article, substance, or compound made, manufactured, or produced in violation of the provisions of this section, whether such article, substance, or compound shall have been made, manufactured, or produced within this State or in any other State or country; and the having in possession by any person, firm, or corporation of any article, substance, or compound made, manufactured, or produced in violation of the provisions of this section shall be considered as prima facie evidence of an intent to sell the same as butter or as cheese contrary to the provisions of this section.<sup>1</sup>

Cheese brands. SEC. 17. The Minnesota State Dairy and Food Commissioner is hereby authorized and directed to procure and issue to the cheese manufacturers of the State, and under such regulations as to the custody and use thereof as he may prescribe, a uniform stencil brand bearing a suitable device or motto, and the words "Minnesota State Full Cream Cheese." Every brand issued shall be used upon the outside of the cheese, and also upon the package containing the same, and shall bear a different number for each separate manufactory, and the commissioner shall keep a book in which shall be registered the name, location, and number of each manufactory using the said brand, and the name or names of the persons at each manufactory authorized to use the same. It shall be unlawful to use or permit such stencil brand to be used upon any other than full cream cheese, or packages containing the same.

Cheese standard. All cheese branded as "Minnesota State Full Cream Cheese" shall contain not less than forty-five per centum of fats to total solids, and all cheese purporting to be full cream cheese which contains less than forty-five per centum of fats to total solids, shall be deemed, for the purpose of this act, to be adulterated.

<sup>1</sup> Circuit Court, D. (District Judge Lochren). Minnesota. September 21, 1899. "Oleomargarine is a lawful subject of commerce, and a State statute (Act Minn. April 19, 1899, § 16) which prohibits the sale of oleomargarine so colored as to resemble butter is unconstitutional and void in so far as it applies to a sale within the State of oleomargarine manufactured in another State, and imported by the agent of the manufacturer, and sold by him in the original and unbroken packages of importation, stamped and marked as required by the act of Congress of August 2, 1886, the product being composed of the materials described in said act as constituting lawful oleomargarine of commerce." (From *Federal Reporter*, November 21, 1899, p. 963.)

**“Skim cheese;” label required.** SEC. 18. All cheese which contains less than forty-five per centum of fats to total solids is hereby declared to be “skim cheese,” and it is hereby required and directed that the same shall be marked with a stencil or brand with the words “Skim Cheese,” in plain black letters, not less than one and one-half inches in length and of proportionate width, upon the circumference of the cheese, and upon the outer surface of the box or package containing the same; and any dealer or trader who, by himself, or as the servant or agent of another person, has in his possession with intent to sell, offers or exposes for sale, or sells any skim cheese as hereinbefore defined, which is not stenciled or branded as hereinbefore required and directed, shall be deemed to be guilty of a misdemeanor, and shall be subject to the penalties provided in this act.

**Sign to be displayed where it is sold.** Every dealer or trader who offers or exposes for sale or sells skim cheese as hereinbefore defined, shall cause to be kept continuously posted in a conspicuous position upon the walls of the room wherein such skim cheese is offered or exposed for sale or sold, cards upon the face of which is distinctly and legibly printed in the English language, and in letters of sufficient size to be visible from all parts of the room, the words “Skim Cheese Sold Here.”

**False brands or labels prohibited.** SEC. 19. No person, by himself or agent, shall sell or offer or expose for sale, or have in his possession with intent to sell, cheese branded or labeled with a false brand or label as to the quality of the article, or as to the county or State in which the article is made.

**Notice of use of oleomargarine.** SEC. 20. Every proprietor, keeper, landlord, or steward of any hotel, restaurant, dining car, eating house, boarding house, or lumber camp, either public or private, who shall supply the guests or boarders of such hotel, restaurant, dining car, eating house, boarding house, or lumber camp with any oleaginous substance or substances or any compound of the same, or any other compound other than that produced from unadulterated milk, or of cream from the same, or any article designed to take the place of butter, shall cause to be plainly printed upon every bill of fare used in said hotel, restaurant, eating house, boarding house, or lumber camp, when such adulterated compound is used immediately under the title thereof and before the naming of any article of food thereon, in capital letters, no smaller than those known as non-parallel celtic, in the English language, the words “Oleomargarine (or butterine) used as a substitute for butter.” In case no bill of fare is used in said hotel, restaurant, dining car, eating house, boarding house, or lumber camp, then the proprietor or keeper thereof shall cause to be posted upon each and every side of the dining room or eating room, in a position where the same can be seen from any part of said room, and in letters large enough to be distinctly seen and read from any part of said room, a card containing the words in the English language “Oleomargarine (or butterine) used as a substitute for butter,” and shall keep the same continuously posted as aforesaid, so long as said compounds, or either of them, are kept and used. The provisions of this section shall not be construed as in any wise amending or invalidating any of the provisions of sections fifteen (15) or sixteen (16), of this act.

**Statistical reports from creameries and cheese factories.** SEC. 21. The commissioner shall provide blanks which shall be furnished to all proprietors or managers of creameries and cheese factories within the State for the purpose of making a report of the amount of milk and dairy goods handled, and embodying such other statistical information as the commissioner may require, and all owners or managers of said creameries and cheese factories shall, on the first day of November of each year, send to the dairy and food commissioner a full and accurate report of the amount of business done during the year, including the statistical information required by said commissioner.

**Seizure of unlawful products.** SEC. 22. It shall be the duty of said commissioner, assistant commissioners, inspectors, and agents at any and all times to seize and take possession of any and all food and dairy products, or substitutes thereof, or imitations thereof, kept for sale or for a purpose, or held in possession or under control, contrary to the provisions of this act, or other laws which now exist, or may be hereafter enacted. Such seizure may be had without a warrant and said commissioner, assistant commissioners, and all inspectors and agents appointed pursuant to law are hereby given full power and authority of constables. Any court having jurisdiction, upon receiving proof of probable cause for believing in the concealment of any food or dairy products or substitutes thereof, or imitations thereof, kept for sale or for a purpose, or had in possession or under control, contrary to the provisions of this act, or other laws which now exist or may be hereafter enacted, shall issue a search warrant and cause a search



to be made in any place therefor, and to that end may cause any building, enclosure, wagon, or car to be entered, and any apartment, chest, box, locker, tub, jar, crate, basket, or package to be broken open and the contents thereof examined.

**Search warrants.** SEC. 23. All such warrants shall be directed to said commissioner, or assistant commissioners, or any inspector or agent appointed pursuant to law, or the sheriff or constable, commanding such commissioner, assistant commissioners, inspector, agent, or officer to search the house or place where such food or dairy product or substitute therefor or imitation thereof for which he is required to search is believed to be concealed, which place and the property to be searched for shall be designated in the warrant, and to bring such food or dairy product, or substitutes therefor or imitations thereof, when found, and the person in whose possession the same is found, before the magistrate who issued the warrant, or before some other court or magistrate having jurisdiction of the case.

**Disposition of seized goods.** SEC. 24. When the officer in the execution of any search warrant issued under this act finds and seizes any food or dairy product, or substitute therefor or imitation thereof, all the property or things so seized shall be safely kept by the direction of the court or magistrate so long as is necessary for the purpose of being produced in evidence in any trial, and on such trial, it being found that such food or dairy product, or any substitute therefor or imitation thereof, is being kept for sale or for a purpose, or held in possession or under control, contrary to the provisions of this act, or other laws which now exist or may be hereafter enacted, the court shall, in addition to the other penalties prescribed by this act, order that said property be forfeited to the State of Minnesota, and shall order the same sold for any purpose other than to be used for food, and the proceeds thereof paid into the State treasury and placed to the credit of the State Dairy and Food Commissioner's fund. The Dairy and Food Commissioner, his agent or inspector is authorized to take samples from products seized for the purpose of analysis.

**Effacement of marks, etc.** SEC. 25. No person shall efface, erase, cancel, or remove any mark, statement, or label provided for by this act with the intent to mislead, deceive, or to violate any provisions of this act.

**Unlawful sales; no action.** SEC. 26. No action shall be maintained on account of any sale; or other contract made in violation of, or with intent to violate, any provisions of this act.

**Evidence of violation.** SEC. 27. The doing of anything prohibited, and the not doing of anything directed to be done by this act, shall be prima facie evidence of a willful intent to violate the different sections and provisions hereof.

SEC. 28. In all prosecutions arising under this act the certificate of the chemist making the analysis, when duly sworn to by such analyst, shall be prima facie evidence of the fact or facts therein certified.

**Fees, fines, etc., go to commissioner's fund.** SEC. 29. All moneys received from license fees, all fines collected for the violation of laws relating to food or dairy products, their imitations or substitutes, and the proceeds from all goods confiscated and sold under the provisions of this act and other laws relating to dairy or food products, their imitations or substitutes, shall be paid into the State treasury and placed to the credit of the Dairy and Food Commissioner's fund.

**Penalty.** SEC. 30. Whoever violates any of the provisions of this act shall be guilty of a misdemeanor, and upon conviction thereof shall be punished for each offense by a fine of not less than twenty-five nor more than one hundred dollars, or by imprisonment of not less than thirty days, nor more than ninety days.

**Repeal.** SEC. 31. Chapter 11, General Laws of 1891, and all acts and parts of acts inconsistent with the provisions hereof are hereby repealed.

**In effect.** SEC. 32. This act shall take effect and be in force from and after its passage.

GENERAL LAWS 1899, Chapter 257.

AN ACT to prevent the use of chemical agents as preservatives in milk, cream, cheese, and butter. (Approved April 18, 1899.)

**Use of preservatives prohibited.** SECTION 1. Any person, firm, or corporation who shall sell, or offer for sale, or consign, or have in his pos-



session with intent to sell to any person or persons, any milk, cream, butter, cheese, or any other dairy products, or who shall deliver to any creamery or cheese factory, milk or cream to be manufactured into butter or cheese, to which has been added any preparation in powdered or liquid form, known as preservatives, or any other compounds containing antiseptics, shall be deemed guilty of a misdemeanor, and upon conviction therefor be punished by a fine of not less than

**Penalty.** twenty-five nor more than one hundred dollars for each and every offense.

This shall not be construed to prohibit the use of salt in butter.

**Commissioner to enforce.** SEC. 2. The State Dairy and Food Commissioner and his assistants, experts, and chemists, by him appointed, shall be charged with the proper enforcement of all the provisions of this act.

**Costs and fines.** SEC. 3. In all prosecutions under this act the costs shall be paid in the manner now provided by law, and the fines resulting therefrom shall be paid into the State treasury and placed to the credit of the State Dairy and Food Commissioner's Fund.

**In effect.** SEC. 4. This act shall take effect and be in force from and after its passage.

#### GENERAL LAWS 1899, Chapter 94.

AN ACT to prevent fraud in the branding and sale of process and renovated butter. (Approved March 23, 1899.)

**Butter from melted packing stock, etc., to be branded.** SECTION 1. No person, firm, corporation, agent, or employe shall manufacture, sell, offer or expose for sale, in this State, any butter that is produced by taking original packing stock butter, or other butter, or both, and melting the same so that the butter fat can be drawn off or extracted, then mixing the said butter fat with skimmed milk, or milk, or cream, or other milk product, and rechurning or reworking the said mixture, or that produced by any process that is commonly known as boiled, process or renovated butter, unless the same is branded or marked as provided in section 2 of this act.

**"Renovated butter."** SEC. 2. No person, firm, corporation, agent, or employe shall sell, offer or expose for sale, or deliver to purchaser, any boiled, process or renovated butter, as defined in section 1 of this act, unless the words "Renovated Butter" shall be plainly branded with Gothic or bold-faced letters at least three-fourths of an inch in length, on the top and sides of each tub or box or pail, or other kind of a case or package, or on the wrapper of prints or rolls in which it is put up. If such butter is exposed for sale uncovered, or not **Placard.** in a case or package, a placard containing the label so printed shall be attached to the mass of butter in such manner as to easily be seen and read by the purchaser.

The branding or marking of all packages shall be in the English language, and in a conspicuous place, so as to be easily seen and read by the purchaser.

**Commissioner shall enforce.** SEC. 3. The State Dairy and Food Commissioner and his assistants, experts, and chemists, by him appointed, shall be charged with the proper enforcement of all the provisions of this act. When complaint is made by the said Dairy and Food Commissioner, his assistants, employes, and chemists, or by any other person authorized by the said Dairy and Food Commissioner, security for costs shall not be required of the complainant in any case at any stage of the prosecution on trial.

**Penalty.** SEC. 4. Whoever violates any of the provisions of this act shall be deemed guilty of a misdemeanor, and shall for each offense, upon conviction thereof, be subject to a fine of not less than twenty-five dollars, nor more than fifty dollars and costs, or by imprisonment not to exceed two months.

**Authority to inspect.** SEC. 5. The said commissioner and his assistants, experts, chemists and agents, he shall duly authorize for the purpose, shall have access and ingress to all places of business, factories, stores, and buildings used for the manufacture or sale of butter. They also shall have power and authority to open any tub, box, pail, or other kind of case or package, containing any butter that may be manufactured, sold, or exposed for sale, in violation of the provisions of this act.

**In effect.** SEC. 6. This act shall take effect and be in force from and after its passage.

## PROVISION OF THE PENAL CODE.

SEC. 331 (section 6625, Statutes 1894). A person who either—  
**Adulteration of food or drink.** 1. With intent that the same may be sold as unadulterated or undiluted, adulterates or dilutes wine, milk, distilled spirits, or malt liquor, or any drug, medicine, food, or drink, for man or beast; or,  
**Sale of adulterated food or drink.** 2. Knowing that the same has been adulterated or diluted, offers for sale or sells the same as unadulterated or undiluted, or without disclosing or informing the purchaser that the same has been adulterated or diluted, in a case where special provision has not been otherwise made by statute for the punishment of the offense,  
**Misdemeanor.** —Is guilty of a misdemeanor.

## MISSISSIPPI.

See Fourteenth Annual Report of the Bureau of Animal Industry, pages 623 and 624, for—

Laws of 1882, chapter 50 (sections 1-3).—An act to regulate the sale of oleomargarine and to promote the public health. (Approved March 9, 1882.)

Privilege taxes and other revenue laws in force 1898, chapter 5 (one section).—An act creating privilege taxes on certain industries in Mississippi, and repealing all laws in conflict with same.

Annotated Code of 1892, section 1187 (2912).—Concerning the treatment of the cow of another.

## MISSOURI.

See Fourteenth Annual Report of the Bureau of Animal Industry, pages 624-627, for—

Laws of 1891, page 163 (sections 1 and 2).—An act to empower cities and towns, by ordinance, to license and regulate milk dairies and the sale of milk, and provide for the inspection thereof, and to repeal an act entitled "An act to prevent the adulteration of milk and cream in all cities that now have or may hereafter have a population of three hundred thousand inhabitants or over," approved June 14, 1889. (Approved April 18, 1891.)

Laws of 1897, page 104 (sections 1-8).—An act requiring the branding or labeling of skim-milk cheese when offered for sale. (Approved March 24, 1897.)

Revised Statutes of 1889, sections 3885 and 3886 (Revised Statutes 1899, sections 2276 and 2277).—Concerning butter and cheese substitutes.

Laws of 1895, page 26 (sections 1-12).<sup>1</sup>—An act prohibiting the coloring yellow of any substance designed to be used as a substitute for butter; to prohibit the manufacture, sale, keeping for sale, and fraudulent use of substances designed as imitation butter; to regulate the manufacture, sale, and keeping for sale of any substance designed to be used as a substitute for butter, and making an appropriation for carrying out the provisions of this act. (Approved April 19, 1895.)

## MONTANA.

See Fourteenth Annual Report of the Bureau of Animal Industry, pages 627 and 628, for—

Codes and Statutes, Penal Code, 1895, sections 684-686 and 1095, and Political Code, section 4064.—Concerning substitutes for butter and cheese, and care of cows.

## NEBRASKA.

See Fourteenth Annual Report of the Bureau of Animal Industry, pages 628-632, for—

Compiled Statutes, 1897, part 3, chapter 22, 6898 (section 234).—Concerning impure milk.

<sup>1</sup> Appropriation for enforcing this act in years 1899 and 1900, \$5,000.

Compiled Statutes, 1897, part 3, chapter 23, 6927-6940 (sections 245k-249n).—Concerning impure milk and imitations of butter and cheese.

General Laws of 1897, chapter 99 (sections 1-5).—An act to provide against the adulteration of food, prohibiting the sale, or offering for sale, of adulterated food and providing a penalty for the violation thereof. (Approved April 12, 1897.)

Recently enacted:

LAWS OF 1899, Chapter 35.<sup>1</sup>

AN ACT creating a Food Commission; defining its powers and duties and of the officers and agents thereof; regulating the manufacture and sale of foods including "imitation butter" and "imitation cheese" and dairy products; providing for a system of reports, inspection and permits and fixing fees for the same; providing penalties for violations of this act; making an annual appropriation for carrying this act into effect; and repealing all acts and parts of acts in conflict herewith. (Approved April 3, 1899.)

**Food commission; office.** SECTION 1. There is hereby created a Food Commission with headquarters at the Capitol, for which office-room, stationery, postage, expressage, printing, and other usual facilities for transacting business shall be furnished, the same as for other executive departments.

**Governor is commissioner and appoints deputy; salary.** SEC. 2. The Governor of this state is hereby made the Food Commissioner of said Commission. Said Food Commissioner shall have the power to appoint a Deputy Food Commissioner at a salary of Fifteen Hundred Dollars (\$1500.00) per annum, payable monthly, together with his expenses actually and necessarily incurred in discharging the duties of his office.

**Duties and authority.** It is further provided that a complete and itemized account of all expenses shall be kept by said Deputy Food Commissioner and filed monthly with the Auditor of Public Accounts after being duly verified by him.

Said Deputy Food Commissioner shall hold his office at the pleasure of the Governor, and when acting for and instead of said Food Commissioner, shall and may exercise equal power and authority subject to the approval of said Food Commissioner.

**Qualifications.** The Deputy Food Commissioner so appointed shall be a person of recognized standing, experience, ability and knowledge in and concerning dairy and other food products.

**Bond of deputy.** SEC. 3. The said Deputy Food Commissioner shall, before entering upon the discharge of his duties, give a bond in the sum of Three Thousand (\$3,000) Dollars with sureties as provided by law, to be approved by the Governor and conditioned for the faithful discharge of his duties and the a counting for all money and other property that may come into his hands by virtue of his office.

**Clerk.** The said Deputy Food Commissioner may employ a clerk, if found necessary, whose salary shall not exceed Seventy-five Dollars (\$75) per month.

**Annual report.** The said Deputy Food Commissioner shall make an annual report to the Governor, same as other State officers, on or before the first day of November, of each year, giving in a concise manner, in said report, a full statement of the condition of the food and dairy interests of the State, and making such recommendations as he may deem best to improve the same, including receipts and disbursements of his office; and such report shall be printed and published and distributed same as reports of other State officers.

**Duty of commission.** SEC. 4. The said Food Commission, through its duly accredited officers, shall be charged with the enforcement of this act and all other acts and laws heretofore passed, or that may hereafter be passed, concerning butter, cheese, "imitation butter," "imitation cheese," milk and cream, vinegar, cider, and all laws concerning dairy products, cider or vinegar, or any imitation or adulteration thereof.

**Control of milk tests and standards.** The said Food Commissioner shall have control over the subject of testing milk and cream in the State of Nebraska, on the farm, in the factory, skimming station, milk or cream depot, milk or cream wagon, or any other place where milk or cream is bought or sold, and may make such regulations concerning the subject of testing milk and

<sup>1</sup> Practical operations under this act have been nullified, as the salary of the deputy commissioner can not be paid, because the act contravenes a section in the constitution providing that bills making appropriations for salaries shall contain no provisions on other subjects.



cream as he may deem reasonable and just, and shall have power to establish a minimum standard of butter fat in milk and cream.

**Authority for inspections.** The said Food Commission and its duly accredited officers, such as shall be duly authorized for the purpose, shall have full access, ingress, and egress to all creameries, cheese factories, skimming stations, cider manufactories, vinegar manufactories, farms, buildings, carriages, cars, vessels, packages, or cans, used in the manufacture or sale of any dairy product, cider or vinegar, or any imitation thereof. They shall also have power and authority to open any package, can, or vessel containing such dairy product, cider or vinegar, or any imitation or adulteration thereof which they may have reason to believe may be manufactured, sold, or exposed for sale in violation of the provisions of this act or other acts in relation thereto, and may inspect the contents therein, and may take therefrom samples for analysis, and have

**Analyses of samples.** the same analyzed by a competent chemist, for which the chemist shall be allowed a reasonable fee not to exceed Five Dollars (\$5.00) for each analysis, and the findings of such chemist shall be taken prima facie evidence in court, and in all prosecutions under this act when such analysis has been made and given in evidence, the said fees and expenses of the chemist making the same, shall be taxed as costs in the case, the same as other costs are taxed. All

**Penalty.** persons knowingly violating this act shall be dealt with as provided in this act.

**Imitation butter and cheese, reports on wholesale sales.** SEC. 5. Every person, firm, or corporation in this State manufacturing or dealing, excepting retailer in "imitation butter" or "imitation cheese" or both, shall, on or before the tenth day of each month, on blanks provided by said Food Commissioner, make a report in writing to said Food Commissioner, showing the amount of "imitation butter" or "imitation cheese" or both, sold by them during the preceding month, size of packages used, to whom and when sold, business location of the purchaser, amount of "imitation butter" or "imitation cheese" or both on hand at the close of the month's business, and such other items and facts as may be required by said Food Commissioner, verifying the same under oath and specifying particularly that they have complied with all the State laws in regard to such "imitation butter" or "imitation cheese" or both, as the case may be: *Provided*, That the retailer shall not be required to state to whom sold nor location of purchaser.

**Definitions.** SEC. 6. Every person, firm, or corporation who in any manner produces "imitation butter" or "imitation cheese" or both, as the same is now defined, or may hereafter be defined in the statutes of this State, shall be considered a manufacturer of "imitation butter" or "imitation cheese" or both.

**Wholesale dealer in imitations.** Every person, firm, or corporation who sells or offers for sale or has in his possession for sale "imitation butter" or "imitation cheese" or both, as the same is now defined in the statutes of this State, or hereafter may be defined, in packages containing ten pounds or more, shall be deemed a wholesale dealer in "imitation butter" or "imitation cheese" or both, as the case may be.

**Retail dealer in imitations.** Every person, firm, or corporation who sells or offers for sale or has in his possession for sale "imitation butter" or "imitation cheese" or both, as the same is now defined or may hereafter be defined in the statutes of this State, in packages containing less than ten pounds each, shall be deemed a retail dealer in "imitation butter" or "imitation cheese" or both.

**Manufacturer of ladle butter.** Every person, firm, or corporation buying, reworking, and handling the product commonly known and called "store" or "dairy" butter, and making out of the same what is generally known and termed "ladle" or "factory" butter, shall be deemed a manufacturer of "ladle" butter.

**Wholesale dealer in butter and cheese.** Every person, firm, or corporation buying and selling butter and cheese or both, in original packages not of his own production, whether on commission or otherwise, shall be deemed a wholesale dealer in butter or cheese or both, as the case may be.

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**Creamery.** For the purposes of this act, a creamery shall be defined as "factory where cream from milk with or without the addition of salt and coloring matter is churned into butter."



**Cheese factory.** A cheese factory shall be defined as "a factory where milk with or without the addition of salt, rennet, and coloring matter, is manufactured into cheese."

**Skimming station.** A "skimming station" shall be defined as "a place where milk, from not less than five patrons, is skimmed by machinery and the cream resulting therefrom is taken to a creamery to be churned."

**Permit necessary to make or sell imitations.** SEC. 7. It shall be unlawful for any manufacturer, wholesale or retail dealer in "imitation butter" or "imitation cheese" or both, to enter upon or engage in the business of producing, manufacturing, handling, or having in his possession for sale, or selling "imitation butter" or "imitation cheese" or both, without first procuring from said Food Commissioner an annual permit, said permit describing the occupation and place of business of the person, firm, or corporation receiving the same, and conditioned on a faithful observance of the laws of the State by him.

**Some manufacturers excepted.** *Provided,* That any manufacturer of "imitation butter" or "imitation cheese" or both, who sells only "imitation butter" or "imitation cheese" or both, of his own production at the place of manufacture in the original packages shall not be required to take out a permit as a wholesaler.

**Permit required to make ladle butter or to make or sell butter or cheese.** It shall be unlawful for any person, firm, or corporation to manufacture "ladle" butter or to carry on the business of manufacturing

"ladle" butter or to carry on business as a wholesale dealer in butter or cheese or both \* \* \* or to operate any creamery or cheese factory or skimming station, or to do any business in producing, manufacturing, handling, or selling the product so made, without first procuring from said Food Commissioner an annual permit, said permit describing the occupation and place of business of the person, firm, or corporation receiving the same and conditioned on a faithful observance of the laws of the State by him.

**Applications for permits.** All applications for permits under this act shall be in writing addressed to the said Food Commissioner, verified by the applicant, stating that after this act shall become a law he has not violated any of the provisions of this act.

**Authority for inspections.** It is further provided that the said Food Commission through its accredited officers shall have the right at any and all times to inspect the premises, methods, and processes of any creamery, cheese factory, skimming station, station, manufacturer of ladle butter, wholesale dealer in butter or cheese or both, \* \* \* manufacturer of "imitation butter" or "imitation cheese" or both, who esale dealer or retail dealer in "imitation butter" or "imitation cheese" or both, within this State, within the provisions of this act or other acts relating to dairy products, cider or vinegar, or any imitation or adulteration thereof.

**Charge for permits and inspections.** SEC. 8. For said permits and the services performed in connection therewith, including the inspection as provided by this act, there shall be charged and collected annually as follows: From each manufacturer of "imitation butter" or "imitation cheese" the sum of One Hundred Dollars (\$100.00); from each wholesale dealer in "imitation butter" or "imitation cheese," Fifty Dollars (\$50.00); from each retail dealer in "imitation butter" or "imitation cheese," Twenty-five Dollars (\$25.00); \* \* \* from each creamery, Ten Dollars (\$10.00); from each cheese factory, Ten Dollars (\$10.00); from each skimming station, One Dollar (\$1.00); from each manufacturer of "ladle" butter, Fifteen Dollars (\$15.00); and from each wholesale dealer in butter or cheese, Ten Dollars (\$10.00), payable in each and every case into the Treasury of the State of Nebraska, as provided by law, in advance of the issuance of said permit.

**Revocation of permit for violation.** SEC. 9. If any person, firm, or corporation to whom such permit has been issued shall be convicted of a wilful violation of any of the provisions of this act, such conviction shall thereupon "ipso facto" work a revocation of such permit and the same shall hereafter be held and deemed null and void.

**County attorneys to prosecute.** SEC. 10. It shall be the duty of all county attorneys on request of the Food Commissioner to represent and prosecute, on behalf of the State within their respective counties, all offenses arising under the provisions of this act.

**Penalty.** SEC. 11. Any person, firm, or corporation violating any provision of this act shall be deemed guilty of a misdemeanor and on conviction thereof shall be punished for each offense by a fine of not less than Ten Dollars (\$10.00) nor more than One Hundred Dollars (\$100.00), in the discretion of the court. It is further provided that each day's failure in taking out the permit described above, shall constitute in each of the above cases a separate and distinct offense.

**Appropriation.** SEC. 12. There is hereby annually appropriated out of the funds of the State not otherwise appropriated, for the purpose of carrying into effect the provisions of this act, the sum of Five Thousand Dollars (\$5,000.00): *Provided*, That the amount paid out shall in no case exceed the amount received by the State, as provided for in this act.

**Repeal.** SEC. 13. All acts and parts of acts in conflict herewith are hereby repealed.

## NEVADA.

See Fourteenth Annual Report of the Bureau of Animal Industry, pages 632 and 633, for—

General Statutes, 1885 (Baily and Hammond), 4801-4805 (sections 1-5).—An act to prevent the adulteration of milk and to prevent traffic in impure and unwholesome milk. (Approved February 17, 1879. 36.)

General Statutes, 1885 (Baily and Hammond), 4806-4809 (sections 1-4), Supplement.—Concerning milk inspector. (Approved February 26, 1881. 79.)

General Statutes, 1885 (Baily and Hammond), 4810-4812 (sections 1-3).—An act to punish and prevent deception in the manufacture and sale of butter. (Approved February 4, 1881. 24.)

## NEW HAMPSHIRE.

See Fourteenth Annual Report of the Bureau of Animal Industry, pages 633-636, for—

Public Statutes, 1891, chapter 127 (sections 1-24).—Concerning milk inspectors, licenses, milk standards, etc.

Laws of 1893, chapter 37 (sections 1 and 2).—An act in amendment of chapter 127 of the Public Statutes relating to the sale of adulterated butter, oleomargarine, and imitation cheese. (Approved March 23, 1893.)

Laws of 1895, chapter 115 (sections 1-4).—An act in amendment of chapter 127 of the Public Statutes relating to the sale of adulterated butter, oleomargarine, and imitation cheese. (Approved March 29, 1895.)

Recently enacted:

### LAWS OF 1899, Chapter 58.

AN ACT providing additional duties for the State Board of Agriculture. (Approved March 9, 1899.)

SECTION 1. It shall be the duty of the State board of agriculture to cause the provisions of chapter 115 of the laws of 1895 relating "to the sale of adulterated butter, oleomargarine, and imitation cheese," to be enforced.

## NEW JERSEY.

See Fourteenth Annual Report of the Bureau of Animal Industry, pages 636-650, for—

Public Laws of 1865, chapter 275 (section 1). (=General Statutes, 1895, Dairy, section 3).—An act to protect butter and cheese manufacturers. (Approved March 23, 1865.)

Public Laws of 1882, chapter 82 (sections 1-11). (=General Statutes, 1895, Dairy, sections 33-43).—An act to prevent the adulteration and to regulate the sale of milk. (Approved March 14, 1882.)

Public Laws of 1884, chapter 90 (sections 1-5). (=General Statutes, 1895, Dairy, sections 44-48.)—Supplement.—Concerning trial by jury. (Approved April 2, 1884.)

Public Laws of 1886, chapter 186 (1 section.) (=General Statutes, 1895, Dairy, section 49.)—Supplement.—Concerning dairy commissioner. (Approved February 20, 1886.)

Public Laws of 1887, chapter 2 (1 section). (=General Statutes, 1895, Dairy, section 50.)—Supplement.—Concerning milk analysis. (Approved February 24, 1887.)

Public Laws of 1888, page 461 (section 2) (=General Statutes, 1895, Agriculture, section 81).—An act to provide for the construction of a State laboratory for the State Agricultural Experiment Station. (Approved April 23, 1888.)

Public Laws of 1891, chapter 210 (sections 1-4) (=General Statutes, 1895, Dairy, sections 51-54). Supplement.—Concerning milk testing. (Approved April 14, 1891.)

Public Laws of 1883, chapter 185 (sections 1 and 2) (=General Statutes, 1895, Dairy, sections 65 and 66).—An act to prohibit the sale of adulterated and skimmed milk in cities of this State. (Approved March 23, 1883.)

Public Laws of 1883, chapter 68 (sections 1-10) (=General Statutes, 1895, Dairy, sections 55-64).—An act for the protection of producers and shippers of milk. (Approved March 8, 1883.)

Public Laws of 1891, chapter 257 (sections 1-7) (=General Statutes, 1895, Dairy, sections 67-73).—An act in relation to milk cans. (Approved April 16, 1891.)

Public Laws of 1864, chapter 370 (sections 1 and 2) (=General Statutes, 1895, Dairy, sections 1 and 2).—An act to regulate the tare of butter and cheese firkins, tubs, and vessels. (Approved April 1, 1864.)

Public Laws of 1886, chapter 84 (sections 1-20) (=General Statutes, 1895, Dairy, sections 4-22).—An act to prevent deception in the sale of oleomargarine, butterine, or any imitation of dairy products, and to preserve the public health. (Approved March 22, 1886.)

Public Laws of 1887, chapter 149 (sections 1-6) (=General Statutes, 1895, Dairy, sections 23-28). Supplement.—Concerning oleomargarine and additional duties of dairy commissioner. (Approved April 21, 1887.)

Public Laws of 1895, chapter 332 (sections 1 and 2) (=General Statutes, 1895, Dairy, sections 29 and 30). Supplement.—Concerning imitation butter. (Approved March 25, 1895.)

Public Laws of 1895, chapter 418 (sections 1 and 2) (=General Statutes, 1895, Dairy, sections 31 and 32).—An act relative to the dairy commissioner. (Approved June 13, 1895.)

Public Laws of 1893, chapter 207 (sections 1-4) (=General Statutes, 1895, animals, sections 113-115).—Supplement to an act entitled "An act concerning contagious and infectious diseases among animals, and to repeal certain acts relating thereto," approved April 4, 1886. (Approved March 16, 1893.)

Public Laws of 1881, page 283 (sections 1-8) (=General Statutes, 1895, Dairy, sections 74-81).—An act to prevent the adulteration of food or drugs. (Approved March 25, 1881.)

Public Laws of 1883, page 185 (sections 1-10) (=General Statutes, 1895, Dairy, sections 82-90). Supplement.—Concerning adulterated food and inspectors. (Approved March 23, 1883.) [Section 7 of this act is repealed by section 2 of Public Laws of 1895, chapter 418] (=General Statutes, 1895, Dairy, sections 31 and 32.)

Public Laws of 1897, supplement to chapter 93 (sections 1 and 2).—Concerning food samples. (Approved April 8, 1897.)

Public Laws of 1887, chapter 126, page 160 (sections 1 and 2) (=General Statutes, 1895, Dairy, section 91). Supplement.—Concerning enforcement of the law. (Approved April 11, 1887.)



## Additional:

LAWS OF 1894, Chapter 317.

SUPPLEMENT to an act entitled "An act concerning contagious and infectious disease among animals and to repeal certain acts relating thereto," approved May fourth, one thousand eight hundred and eighty-six. (Approved May 22d, 1894.)

**Investigation of tuberculosis by a commission.** SECTION 1. That the president of the State board of agriculture shall appoint five persons citizens and taxpayers of this State, who, together with himself and the secretary of the State board of agriculture, shall constitute a commission who shall, at the request of two members of the State board of health or the State dairy commissioner or any owner of suspected animals investigate the existence of tuberculosis, or cause the same to be investigated, and if any such disease is found to exist, to enforce such regulations in relation to the same as the said Regulations. commission may adopt.

**Payment for condemned animals.** SEC. 2. That when any animal or animals shall be slaughtered by direction of said commission, the value of the same shall be ascertained and appraised by three disinterested freeholders, resident in this State, who shall make and sign certificates thereof in the presence of a witness who shall attest the same; such appraisement shall be made on the basis of the market value of the animal or animals slaughtered, just prior to the time when they became so diseased, and shall be limited to the sum of one hundred dollars for registered animals and to forty dollars to all others; one-half of the valuation so ascertained shall be paid by the State on the presentation of such certificate, with the approval of the said commission indorsed thereon, to the owner or owners.

**Annual report.** SEC. 3. That it shall be the duty of said commission to keep a full and complete record of all their proceedings under this act, and report the same annually to the State board of agriculture, and such a report shall be printed in and form a part of the annual report of the State board of agriculture.

**Appropriation.** SEC. 4. That the sum of five thousand dollars is hereby annually appropriated to said commission to defray its expenses and the value of the cattle to be slaughtered by its direction: *Provided*, That no other compensation shall be allowed said commission than the expenses actually incurred in the execution of the duties hereby imposed.

**Payment of bills.** SEC. 5. That all bills for money expended under this act shall be audited by the comptroller of this State and then submitted to the governor for his approval, and after being thus audited and approved by the governor shall be paid by the State treasurer upon the warrant of the comptroller.

**In effect.** SEC. 6. That this act shall be deemed a public act and shall take effect immediately.

## NEW MEXICO.

See Fourteenth Annual Report of the Bureau of Animal Industry, pages 650-652, for—

Compiled Laws of 1897, sections 1244, 1246, and 1248-1257.—Concerning foods and drugs.

Compiled Laws of 1897, title 28, chapter 2, section 2402.—Concerning sales and inspection of provisions.

## NEW YORK.

See Fourteenth Annual Report of the Bureau of Animal Industry, pages 652-658, for—

Laws of 1893, chapter 338 (chapter 33 of the General Laws, article 1, sections 1-12, and article 2, sections 20-37).—An act in relation to agriculture, constituting articles 1, 2, 3, 4, and 5 of chapter 33 of the General Laws. (Approved April 10, 1893.)

## Sections recently amended and added:

**Samples, after mixing, to be in duplicate.** SEC. 12 (as amended by section 1 of chapter 557 of the laws of 1898). When the commissioner of agriculture, an assistant commissioner, or any person or officer author-



ized by the commissioner, or by this chapter, to examine or inspect any product manufactured or offered for sale shall in discharge of his duties take samples of such product, he shall, before taking a sample, request the person delivering the milk or who has charge of it at the time of inspection, to thoroughly stir or mix the said milk before the sample is taken. If the person so in charge refuses to stir or mix the milk as requested, then the person so requesting shall himself so stir and mix the milk before taking the sample, and the defendant shall thereafter be precluded from introducing evidence to show that the milk so taken was not a fair sample of the milk delivered, sold, offered or exposed for sale by him. The person taking the sample of milk for analysis shall take duplicate samples thereof in the presence of at least one witness, and he shall in the presence of such witness seal both of such samples, and shall tender, and, if accepted, deliver at the time of taking one sample to the manufacturer or vendor of such product, or to the person having custody of the same, with a statement in writing of the cause of the taking of the sample. In taking samples of milk for analysis at a creamery, factory, platform, or other place where the same is delivered by the producer

Later sample for comparison. for manufacture, sale, or shipment, or from a milk vendor who produces the milk which he sells, with a view of

prosecuting the producer of such milk for delivering, selling, or offering for sale adulterated milk, the said commissioner of agriculture or assistant, or his agent or agents, shall within ten days thereafter, with the consent of the said producer, take a sample in a like manner of the mixed milk of the herd of cows from which the milk first sampled was drawn and shall deliver the duplicate sample to the said producer and shall cause the sample taken by himself or his agent to be analyzed. If the sample of milk last taken by the commissioner of agriculture or his agent or agents shall upon analysis prove to contain no higher percentage of milk solids, or no higher percentage of fat than as the sample taken at the creamery, factory, platform, or other place, then no action shall lie against the said producer for violation of subdivisions one, two, three, seven, and eight of section twenty of the agricultural law. In taking a second sample as above set forth from the mixed milk of the herd, it shall be the duty of the commissioner of agriculture to have an assistant, agent, or agents present during the entire time in which the said cattle are being milked to observe closely so as to be sure that the milk thus to be sampled is not adulterated and to see that it is thoroughly mixed so that the sample taken shall be a fair sample of the average quality of the mixed milk of the entire dairy or herd of cows of said producer. If, however, the said producer refuses to allow such examination of the milk produced by his dairy, then he shall be precluded from offering any evidence whatever tending to show that the milk delivered by him at the said creamery, factory, platform, or other place was just as it came from the cow. If the said producer does permit such examination, the commissioner of agriculture shall, upon receiving application therefor, send to said producer a copy of the analysis of each of the samples of milk so taken and analyzed as above provided.

Imitations not to be sold as butter or cheese. SEC. 27 (as amended by section 1 of chapter 149 of the laws of 1899). No person shall

manufacture, mix, or compound with or add to natural milk, cream, or butter any animal fats or animal or vegetable oils, nor make or manufacture any oleaginous substance not produced from milk or cream, with intent to sell the same as butter or cheese made from unadulterated milk or cream or have the same in his possession with such intent; nor shall any person solicit or take orders for the same or offer the same for sale, nor shall any such article or substance or compound so made or produced be sold as and for butter or cheese, the product of the dairy.

Coloring oleomargarine, etc., prohibited. No person shall coat, powder, or color with annatto or any coloring matter whatever butterine or oleomargarine or any compound of the same or any product or manufacture made in whole or in part from animal fats or animal or vegetable oils not produced from unadulterated milk or cream by means of which such product, manufacture, or compound shall resemble butter or cheese, the product of the dairy; nor shall he have the same in his possession with intent to sell the same nor

Butter from original packing stock, etc., to be labeled "Renovated butter." shall he sell or offer to sell the same. No person by himself, his agents, or employes shall manufacture, sell, offer or expose for

sale butter that is produced by taking original packing stock or other butter or both and melting the same, so that the butter fat can be drawn off, then mixing the said butter fat with skimmed milk or milk or cream or other milk product and rechurning the said mixture, or that is produced by any similar process and is commonly known as boiled or process butter, unless he shall plainly brand or mark

the package or tub or wrapper in which the same is put up in a conspicuous place with the words "renovated butter." If the same shall be put up, sold, offered or exposed for sale in prints or rolls, then the said prints or rolls shall be labeled plainly with printed letters in a conspicuous place on the wrapper with the words "renovated butter." If the same is packed in tubs or boxes or pails or other kind of a case or package, the words "renovated butter" shall be printed on the top and side of the same in letters, at least one inch in length, so as to be plainly seen by the purchaser. If such butter is exposed for sale, uncovered, not in a package or case, a placard containing the label so printed shall be attached to the mass of butter in such manner as to easily be seen and read by the purchaser. No person shall sell, offer or expose for sale, any butter or other dairy product containing a preservative, but this shall not be construed to prohibit the use of salt in butter or cheese, or spiritous liquors in club or other fancy cheese or sugar in condensed milk.

**Manufacture, sale, and use of poisonous coloring matter prohibited.**

SEC. 29a (as added by section 1 of chapter 518 of the laws of 1899). No person or persons shall manufacture, sell or expose for sale any poisonous coloring matter for the coloring of food products of any kind, nor shall any person or persons use any poisonous coloring matter manufactured, sold, offered or exposed for sale within this State; nor shall any person or persons sell, offer or expose for sale any food product containing such poisonous coloring matter. The State board of health shall cause samples of coloring matter that are exposed for sale upon the market for use in food products to be analyzed and report the results of such analysis to the legislature at the next session.

**Brands for full-milk cheese.**

SEC. 33 (as amended by section 1 of chapter 559 of the laws of 1898). Every manufacturer of full-milk cheese may put a brand upon each cheese indicating "full-milk cheese," and the date of the month and year when made; and no person shall use such a brand upon any cheese made from milk from which any of the cream has been taken. The commissioner of agriculture shall procure and issue to the cheese manufacturers of the State, on proper application therefor, and under such regulations as to the custody and use thereof as he may prescribe, a uniform stencil brand, bearing a suitable device or motto, and the words, "New York State full-cream cheese." Every such brand shall be used upon the outside of the cheese and shall bear a different number for each separate factory. The commissioner shall keep a book, in which shall be registered the name, location, and number of each manufactory using the brand and the name or names of the persons at each manufactory authorized to use the same. No such brand shall be used upon any other than full-cream cheese or packages containing the same.

**Penalties and violations.**

SEC. 37 (as amended by section 1 of chapter 554 of the laws of 1897, and by chapter 558 of the laws of 1898, and by section 1 of chapter 435 of the laws of 1899). Every person violating any of the provisions of articles two and three and sections ninety-one and ninety-two of the agricultural law and chapter four hundred and ninety-one of the laws of eighteen hundred and ninety-eight, shall forfeit to the people of the State of New York a sum not less than twenty-five dollars nor more than one hundred dollars for every such violation. When such violation consists of the manufacture or production of any prohibited article, each day during which or any part of which such manufacture or production is carried on or continued, shall be deemed a separate violation of the provisions of this article. When the violation consists of the sale, or the offering or exposing for sale or exchange, of any prohibited article or substance, the sale of each one of several packages shall constitute a separate violation, and each day on which any such article or substance is offered or exposed, for sale or exchange, shall constitute a separate violation of this article. When the use of any such article or substance is prohibited, each day during which or any part of which said article or substance is so used or furnished for use, shall constitute a separate violation, and the furnishing of the same for use to each person to whom the same may be furnished shall constitute a separate violation. Whoever by himself or another violates any of the provisions of articles two and three and sections ninety-one and ninety-two of the agricultural law shall be guilty of a misdemeanor, and upon conviction shall be punished by a fine of not less than twenty-five dollars, nor more than two hundred dollars, or by imprisonment of not less than one month nor more than six months or by both such fine and imprisonment, for the first offense; and by six months' imprisonment for the second offense.

## NORTH CAROLINA.

See Fourteenth Annual Report of the Bureau of Animal Industry, pages 658 and 659, for—

Public Laws of 1895, chapter 106 (sections 1-6).—An act defining butter and to regulate the sale thereof. (Ratified February 28, 1895.)

[Public Laws of 1895, chapter 122, was repealed by section 12 of the following.]

Recently enacted:

## PUBLIC LAWS OF 1899, Chapter 86.

AN ACT to prevent the sale of adulterated and unbranded food, and to amend and make more effective the provisions of Chapter 122, Laws of 1895. (Ratified Feb 13, 1899.)

Board of Agriculture to have foods, beverages, and condiments examined and publish results.

SECTION 1. That for the purpose of protecting the people of the State from imposition by the adulteration and misbranding of articles of food, the Board of Agriculture

shall cause to be procured from time to time, and under rules and regulations to be prescribed by them, in accordance with section nine of this act, samples of food, beverages, and condiments offered for sale in the State, and shall cause the same to be analyzed or examined microscopically or otherwise by the chemists or other experts of the Department of Agriculture. The Board of Agriculture is hereby authorized to make such publications of the results of the examinations, analyses, and so forth as they may deem proper.

Adulterated foods prohibited.

SEC. 2. That no person, by himself or agent, shall knowingly manufacture, sell, expose for sale, or have in his possession with intent to sell, any article of food which is adulterated or misbranded within the meaning of this act; and any person who shall violate any of the provisions of this act shall be guilty of a misdemeanor and for such offense

Penalty. shall be fined not exceeding two hundred dollars for the first offense,

and for each subsequent offense not exceeding three hundred dollars or be imprisoned not exceeding one year, or both, in the discretion of the Court;

Disposition of fines. and such fines, less legal costs and charges, shall be paid into the treasury of the State for the benefit of the Department of Agriculture, to be used exclusively in executing the provisions of this act.

Chemists of Department of Agriculture to make examinations.

SEC. 3. That the chemists or other experts of the Department of Agriculture shall make, under rules and regulations prescribed by the

Board of Agriculture, examinations of specimens of food, beverages, and condiments offered for sale in North Carolina which may be collected from time to time under their directions in various parts of the State. If it shall appear from such examination that any of the provisions of this act have been violated, the Commissioner of Agriculture shall at once certify the facts to the proper solicitor, and furnish that officer a copy of the result of the analysis duly authenticated by the analyst under oath.

Solicitors shall prosecute.

SEC. 4. That it shall be the duty of every solicitor to whom the Commissioner of Agriculture shall report any violation

of this act, to cause proceedings to be commenced and prosecuted without delay for the fines and penalties in such cases provided.

“Food” and “misbranded” defined.

SEC. 5. That the term “food” as used herein shall include all articles used for food—candy, condiment, or drink, by man or domestic animals, whether simple, mixed, or compound.

The term “misbranded” as herein used shall include all articles of food or articles which enter into the composition of food, the package or label of which shall bear any statement purporting to name any ingredients or substances as being contained or not being contained in such article, which statement shall be false in any particular.

Adulteration defined.

SEC. 6. That for the purpose of this act an article of food shall be deemed adulterated—

First, If any substance or substances has or have been mixed or packed with it, so as to reduce or lower or injuriously affect its quality or strength so that such product when offered for sale shall deceive or tend to deceive the purchaser.



Second. If any inferior substance or substances has or have been substituted wholly or in part for the article so that the product when sold shall deceive or tend to deceive the purchaser.

Third. If any valuable constituent of the article has been wholly or in part abstracted so that the product when sold shall deceive or tend to deceive the purchaser.

Fourth. If it be an imitation of, and sold under the specific name of, another article.

Fifth. If it be mixed, colored, powdered, coated, polished, or stained in a manner whereby damage or inferiority is concealed, so that such product when sold shall deceive or tend to deceive the purchaser.

Sixth. If it contain any added poisonous ingredient or any ingredient which may render such article injurious to the health of the person consuming it.

Seventh. If it be labeled or branded so as to deceive or mislead the purchaser, or purport to be a foreign product when branded so, or in an imitation either in package or label of an established proprietary product, which has been trade-marked or patented.

Eighth. If it consists of the whole or any part of a diseased, filthy, decomposed, or putrid animal or vegetable substance, or any portion of an animal unfit for food, whether manufactured or not, or if it is the product of a diseased animal or of an animal that has died otherwise than by slaughter.

Ninth. That candies and chocolate may be deemed to be adulterated if they contain terra alba, barytes, talc, chrome yellow, or other mineral substances, or poisonous colors or flavors, or other ingredients deleterious or detrimental to health: *Provided*, That an article of food, beverage, or condiment which does not contain any added poisonous ingredient shall not be deemed to be adulterated in the following cases:

First. In the case of articles, mixtures, or compounds which may be now, or from time to time hereafter, known as articles of food, beverages, or condiments under their own distinctive names, and not included in definition fourth of this section.

Second. In the case of articles labeled, branded, or tagged so as to plainly indicate that they are mixtures, compounds, combinations, imitations, or blends.

Third. When any matter or ingredient has been added to the food, beverage, or condiment because the same is required for the production or preparation thereof as an article of commerce in a state fit for carriage or consumption, and not fraudulently to increase the bulk, weight, or measure of the food, beverage, or condiment, or conceal the inferior quality thereof: *Provided*, That the same shall be labeled, branded, or tagged as prescribed by the Board of Agriculture, so as to show them to be compounds and the exact character thereof: *And provided further*, That nothing in this act shall be construed as requiring or compelling proprietors or manufacturers of proprietary foods to disclose their trade formulas except in so far as the provisions of this act may require to secure freedom from adulteration or imitation: *Provided further*, That nothing in this act shall be construed to apply to proprietary or patent medicines.

Fourth. Where the food, beverage, or condiment is unavoidably mixed with some harmless extraneous matter, in the process of collection or preparation;

*Provided further*, That no person shall be convicted under the provisions of this act when he is able to prove a written guaranty of purity in a form approved by the Board of Agriculture as published in their rules and regulations, signed by the wholesale jobber, manufacturer, or other party from whom he purchased said article.

Compound products to be branded. SEC. 7. That the Board of Agriculture is hereby authorized to cause all compound, mixed, or blended products to be properly branded and prescribe how this shall be done.

Exempted articles to be published. SEC. 8. That it shall the duty of the Board of Agriculture to prepare and publish from time to time lists of the articles, mixtures, or compounds declared to be exempt from the provisions of this act in accordance with section six.

Food standards to be fixed by Board of Agriculture. The Board of Agriculture shall also from time to time fix and publish the limits of variability permissible in any article of food, beverage, or condiment, and these standards when so published shall remain the standards before all courts: *Provided*, That when standards have been or may be fixed by the Secretary of Agriculture of the United States, they shall be accepted by the Board of Agriculture and published as the standards for North Carolina.



**Samples for analysis.** SEC. 9. That every person who exposes for sale or delivers to a purchaser any condiment, beverage, or article of food shall furnish, within business hours, and upon tender and full payment of the selling price, a sample of such condiments, beverages, or articles of food to any person duly authorized by the Board of Agriculture to secure the same and who shall apply to such manufacturer or vender or person delivering to a purchaser such beverage or article of food, for such sample for such use in sufficient quantity for the analysis of such article or articles in his possession.

**Hindrance, etc., a misdemeanor.** SEC. 10. That any manufacturer or dealer who refuses to comply upon demand with the requirements of section nine of this act, or any manufacturer, dealer, or person who shall impede, obstruct, hinder, or otherwise prevent or attempt to prevent any chemist, inspector, or other person in the performance of his duty in connection with this act shall be guilty of a misdemeanor and shall upon conviction be fined not less than ten dollars nor more than one hundred dollars, or be imprisoned not more than one hundred days, or both, in the discretion of the Court, and said fines, less the legal costs, shall be paid into the treasury of the State for the benefit of the Department of Agriculture, to be used exclusively in executing the provisions of this act.

**Act not to interfere with commerce.** SEC. 11. That this act shall not be construed to interfere with commerce, or any interstate commerce laws of the United States.

**Repeal.** SEC. 12. That chapter one hundred and twenty-two, Public Laws of one thousand eight hundred and ninety-five, be and the same is hereby repealed.

**In effect.** SEC. 13. That this act shall be in force from the first day of August, one thousand eight hundred and ninety-nine.

## NORTH DAKOTA.

See Fourteenth Annual Report of the Bureau of Animal Industry, pages 660 and 661, for:

Laws of 1895, chapter 49, sections 1-12.—An act entitled "An act to protect dairy interests of the State of North Dakota, and to prevent fraud in dairy products, and to regulate traffic in adulterated butter and cheese." (Approved March 16, 1895.) [Most, if not all, of this act appears to be replaced by the following.]

Recently enacted:

### LAWS OF 1899, Chapter 72.

AN ACT to regulate the manufacture and sale of dairy products and imitations and substitutes therefor, prescribing penalties for violations, to create a deputy commissioner of agriculture, prescribing his duties, and fixing his salary. (Approved March 9, 1899.)

**Assistant dairy and food commissioner; qualifications.** SECTION 1. In order to secure the better enforcement of the provisions of this act, and to promote the improvement of the products of the dairy, the commissioner of agriculture, by and with the advice and consent of the governor, shall appoint one deputy in his department to be known officially as assistant dairy and food commissioner, who shall have a practical knowledge of and experience in the manufacture of dairy products, and hold his office during the term of the commissioner of agriculture, subject to removal from office for inefficiency, neglect, or violation of duty. The said assistant commissioner shall receive a salary of six hundred dollars per annum and his actual and necessary expenses in the discharge of his duties under this act, and shall be charged under the direction of the commissioner of agriculture with the enforcement of the various provisions thereof.

**Appropriation.** The sum of one thousand dollars annually is hereby appropriated, to which shall be added the amount in fines collected in the enforcement of the provisions of this act, to be paid for such purposes out of any moneys in the treasury not otherwise appropriated, and any money so appropriated not expended in the enforcement of the provisions of this act shall revert to the State school fund. All charges, accounts and expenses authorized by this act shall be paid by the treasurer of the State upon the warrant of the State auditor. The entire expense of said assistant commissioner shall not exceed the sum appropriated for the purpose of this act.

**Biennial Report.** SEC. 2. The biennial report of commissioner of agriculture shall contain a detailed report of the work and proceedings, together with an account of expenses and disbursement of said assistant commissioner, since the preceding report, with such facts and statistics in regard to the production, manufacture, and sale of dairy products with such suggestions as he may regard of public importance connected therewith.

**SEC. 3.** The said assistant commissioner and such persons as shall be duly authorized for the purpose shall have access, ingress, and egress to all places of business, factories, farms, buildings, carriages, cars, vessels, and cans used in the manufacture and sale of any dairy products or any imitation thereof. They also shall have power and authority to open any package, can, or vessel containing such articles which may be manufactured, sold, or exposed for sale in violation of the provisions of this act, and may inspect the contents therein and may take samples therefrom for analysis. All clerks, book-keepers, express agents, railroad officials, employees, or common carriers shall render to them any assistance in their power when so requested, in tracing, finding, or discovering the presence of any prohibited article named in this act.

**Refusal to aid a misdemeanor.** SEC. 4. Any refusal or neglect on the part of such clerks, book-keepers, express agents, railroad officials, common carriers, or employees to render such friendly aid shall be deemed a misdemeanor and be punished by a fine of not less than twenty dollars nor more than fifty dollars for each and every offense.

**Annual reports from creameries, venders, etc.** SEC. 5. The said assistant commissioner shall provide blanks which shall be furnished to all proprietors or managers of creameries, cheese factories, and all the venders or peddlers of milk who shall be licensed under the provisions of this act, for the purpose of making a report of the amount of milk and dairy goods handled and all owners or managers of such creameries, cheese factories, and venders or peddlers of milk, shall on the first day of November of each year, send to the assistant dairy and food commissioner a full and accurate report of the amount of business done during the year as designated under the different headings of such printed blanks.

**False reports.** SEC. 6. Any neglect or failure or false statement on the part of any owner or manager of such creamery, cheese factory, or any vender or peddler of milk shall be consider a misdemeanor and be punished by fine of not less than ten nor more than fifty dollars.

**Creameries and cheese factories to use brands.** SEC. 7. Every creamery, cheese factory, or combined creamery and cheese factory engaged in the manufacture of butter and cheese shall procure a stencil or brand bearing a suitable device and words which shall clearly designate the quality of the product manufactured, and the number and location of the factory, and may contain a special or private brand or name of said factory; every brand shall be used upon the outside of the cheese and also upon the package containing the same, but in the case of butter on the package only and shall on the first day of November of each year report to the assistant dairy and food commissioner the name, location, and number of each factory using said brand, and the name or names of the persons at each factory authorized to use the same together with a copy of each stencil or brand and the said assistant commissioner shall keep a book in which shall be registered the same.

**Brands to be registered.** Any neglect or failure to comply with the provisions of this section shall be considered a misdemeanor and shall be punishable by a fine of not less than ten dollars and not more than fifty dollars for each and every offense.

**Milk peddlers shall be licensed.** SEC. 8. Every person who sells milk from a dairy of five or more cows, and conveys the same in carriages, carts, or other vehicles for the purpose of such sale, in any city or town of one thousand inhabitants or more, in the State of North Dakota shall on the first day of June of each year, or within thirty days thereafter be licensed by the assistant dairy and food commissioner to sell milk within the limits of said city or town, and shall pay to the said assistant commissioner the sum of one dollar each to the use of said dairy and food commissioner. But any person desiring to engage in such dairy business shall first procure a license as aforesaid which shall be valid until the first day of June next succeeding the issue. Licenses shall be used only in the names of the owners of carriages, carts, and other vehicles, and shall, for

the purpose of the act, be conclusive evidence of ownership. No license shall be sold, assigned, or transferred.

**Data on licenses.** Each license shall record the name, residence, place of business, number of carriages, carts, or other vehicles used, the name and residence of every driver or other persons engaged in selling said milk, and the number of the license. Each licensee shall, before engaging

**Vehicles to be marked.** in the sale of milk, cause his name, the number of his license, and place of business to be legibly placed on each outer side of all carriages, carts, or other vehicles used by him in the conveyance and sale of milk, and he shall report to the said assistant commissioner any change of driver or other persons employed by him which may occur during the term of his license.

**Penalty for violation.** Whoever without being first licensed under the provisions of this section, sells milk, or exposes it for sale from carriages, carts, or other vehicles, or has in his custody or possession with intent to sell, and whoever violates any of the provisions of this section, shall be punished by a fine of not less than ten dollars and not more than fifty dollars for each and every offense.

**Stores, etc., to be licensed.** SEC. 9. Every person before selling milk or offering it for sale in a store, booth, stand, or market place in the respective towns or cities as designated in this act shall procure a license from the assistant dairy and food commissioner and shall pay to said assistant commissioner the sum of one dollar. Whoever neglects to procure

**Penalty for violation.** said license shall be deemed guilty of a misdemeanor and shall be punished by a fine not exceeding twenty dollars for each and every offense.

**Disposal of impure milk prohibited.** SEC. 10. If any person shall sell, exchange, or expose for sale or exchange, or to be converted into any product of human food any unclean, unhealthy, adulterated, unwholesome, or skimmed milk, or milk from which has been held back what is commonly known as strippings, or milk taken from an animal having disease, sickness, ulcers, abscess, or running sores, or which has been taken from an animal within 15 days before or 5 days after parturition; or if any person having cows for the purpose of

**Care of cows regulated.** producing milk or cream for sale shall stable them in an unhealthy place or crowded manner, or shall knowingly feed them food which produces impure, unwholesome milk, or upon any substance in a state of putrefaction or rottenness or of unhealthy nature, or shall sell or offer

**Impure cream forbidden.** for sale cream which has been taken from milk the sale of which has been prohibited, or shall sell or offer for sale as cream an article which shall contain less than the amount of butter fat as pre-

**Skimmed milk cheese to be labeled.** scribed in this act; or if any person shall sell or offer for sale any cheese manufactured from skimmed milk, or from milk that is partly skimmed without the same being plainly branded, stamped, or marked on the side or top of both cheese and package in a durable manner in the English language the words, "skimmed milk cheese," the letters of the words to be not less than one inch in height and one-half inch in width—he

**Penalty for violation.** shall be fined not less than twenty nor more than fifty dollars; but the provisions of this section shall not apply to skimmed milk when sold as such and in the manner and subject to the regulations prescribed in this act.

**Adulteration of milk defined.** SEC. 11. For the purpose of this act the addition of water or any other substance or thing to whole milk, or skimmed milk, or partially skimmed milk is hereby declared an adulteration, and milk which is obtained from animals fed upon any substance of an unhealthy nature,

**Milk standard.** is hereby declared impure and unwholesome, and milk which has been proved by any reliable method or test or analysis to contain less than twelve per cent of milk solids to the hundred pounds of milk, or than three pounds of butter fat to one hundred pounds of milk shall be regarded as

**Cream standard.** skimmed or partially skimmed milk, and every article not containing fifteen per cent or more of butter fat shall not be regarded as cream.

**Dairy inspection.** It is hereby made the duty of the assistant dairy and food commissioner to inspect such dairies as he shall deem necessary and enforce the provisions of the two preceding sections.

**Imitations of yellow butter prohibited.** SEC. 12. No person by himself or his agents or servants shall render or manufacture, sell, offer for sale, expose for sale, take orders for the future delivery of, have in his possession, keep in storage, distribute, deliver, transfer, or convey with intent to sell within this State any article, product, or compound made wholly or partly out of



any fat, oil, or oleaginous substance or compound thereof, not produced from unadulterated milk or cream from the same, which shall be imitation of yellow butter produced from pure unadulterated milk or cream of the same.

**Oleomargarine permitted.** *Provided*, that nothing in this act shall be construed to prohibit the manufacture or sale of oleomargarine in a separate and distinct form, and in such manner as will advise the consumer of its real character free from coloration or ingredient that causes it to look like butter.

**Penalty.** Whoever violates any of the provisions of this section shall be punished by a fine of not less than twenty-five dollars nor more than one hundred dollars for each and every offense.

**Brand for oleomargarine, etc., required.** **SEC. 13.** Whoever exposes for sale oleomargarine, butterine, or any substance made in imitation or semblance of pure butter in tubs, firkins, or other original packages not distinctly, legibly, and durably branded, stamped, or marked in a conspicuous place with the word "oleomargarine" or "butterine" or "imitation butter," as the case may be, in letters not less than one inch in length and one-half inch in width, or in retail packages not plainly and conspicuously labeled with said words "oleomargarine" or "butterine" or "imitation butter," as the case may be, shall be deemed guilty of a misdemeanor and punished by a fine of not less than twenty-five dollars nor more than one hundred dollars for each and every offense.

**"Process" butter to be labeled "renovated."** **SEC. 14.** Whoever by himself, his agents, or employes shall manufacture, sell, offer, or expose for sale butter that is produced by taking original packing stock or other butter, or both, and melting the same, so that the butter fat can be drawn off, then mixing the said butter fat with skimmed milk, or milk, or cream, or other milk product, and rechurning the said mixture; or that is produced by any similar process and is commonly known as boiled or process butter, unless the tub, firkin, or other original package in which the same may be put up, be distinctly, legibly, and durably branded, stamped, or marked in a conspicuous place with the words "renovated butter" in printed letters not less than one inch in length and one half inch in width, in prints, boxes, or rolls not plainly and conspicuously labeled on the wrapper thereof with said words "renovated butter" in printed letters not less than one-half inch in length and one-quarter inch in width shall be deemed guilty of a misdemeanor and punished by a fine of not less than twenty-five dollars nor more than one hundred dollars for each and every offense.

**Notice to be given of use of oleomargarine in public eating places.** **SEC. 15.** Whoever furnishes or causes to be furnished in any hotel, restaurant, boarding house, or at any lunch counter oleomargarine, or butterine to any guest or patron of such hotel, restaurant, boarding house, or lunch counter in the place or stead of butter shall notify said guest or patron that the substance so furnished is not butter and any party so furnishing without such notice shall be punished by a fine of not less than five dollars nor more than ten dollars for each and every offense.

**Substitute or filled cheese to be labeled.** **SEC. 16.** Any person or firm who shall sell or offer for sale or make or manufacture out of any oleaginous substance or substances or any compound of the same or any other compound other than that produced from unadulterated milk any article designed to take the place of cheese, produced from pure milk or any article termed "filled-cheese" shall stamp each package of the same on the top and side with lamp black and oil the words "filled-cheese" or words that shall designate the exact character and quality of the product in printed letters at least one inch long and one-half inch wide. Whosoever violates the provisions of this section is guilty of a misdemeanor and shall be punished by a fine of not less than twenty-five dollars nor more than one hundred dollars for each and every offense.

**Assistant commissioner, director of farmers' institutes.** **SEC. 17.** The assistant dairy and food commissioner shall be director of farmers' institutes in the State and have charge of all matters relating thereto. He shall arrange for holding as many farmers' institutes during the year as possible and in connection with local committee where institute is to be held shall prepare program and provide for speakers and lectures. The expense of such institutes shall be limited to the actual expense of travel and entertainment for speakers and lecturers.

**Repeal.** **SEC. 18.** All acts and parts of acts inconsistent or in conflict with the provisions of this act are hereby repealed.



## OHIO.

See Fourteenth Annual Report of the Bureau of Animal Industry, pages 661-669, for—

Ohio Laws, volume 83, page 120<sup>1</sup> (sections 1-4) (= Giauque, 8847-8850).—An act to create the office of dairy and food commissioner, provide for his election, term of office, duties, salaries, expenses, office, disposition of fines collected, annual reports, etc. (Passed and took effect May 8, 1886.)

Ohio Laws, volume 88, page 74 (section 1).—An act to require the Ohio dairy and food commissioner to give bond. (Passed and took effect March 4, 1891.)

Ohio Laws, volume 86, page 229 (sections 1-4) (= Giauque, 8837-8840).—An act to regulate the sale of milk. (Passed and took effect April 10, 1889.)

Ohio Laws, volume 83, page 178 (sections 1-17)<sup>2</sup> (= Giauque, 8821-8834, 8836).—An act to prevent adulteration of and deception in the sale of dairy products, and supplementary to Chapter II, Title I, part 4, of the Revised Statutes. (Passed and took effect May 17, 1886.)

Ohio Laws, volume 87, page 51 (sections 1-3)<sup>2</sup>.—An act to prevent deception in the sale of dairy products and to preserve the public health. (Passed March 7, 1890; took effect May 1, 1890.)

Ohio Laws, volume 91, page 274 (sections 1-7).—An act to prevent fraud and deception in the manufacture and sale of oleomargarine and promote public health in the State of Ohio. (Passed and took effect May 16, 1894.)

Ohio Laws, volume 92, page 51 (sections 1-10).—An act to prevent fraud in the manufacture and sale of imitations of cheese or substitutes for cheese, and to regulate the branding of cheese in the State of Ohio. (Passed and took effect March 3, 1893.)

Ohio Laws, volume 81, page 67 (sections 1-5).—An act to provide against the adulteration of food and drugs. (Passed March 20, 1884; took effect forty days later.)

Following should be added:

## OHIO LAWS, Volume 91, page 412.

AN ACT to amend sections [section ?] 3718*a* of the Revised Statutes of Ohio. (Passed and took effect May 21, 1894.)

SECTION 1. That section 3718*a* of the Revised Statutes of Ohio, be and the same is hereby amended to read as follows:

**Jurisdiction in violation of food and dairy laws.** SEC. 3718*a*. Any justice of the peace, within his county and city, police judge or mayor of any city or village, within his city or village, shall have jurisdiction in case of violation of the laws, to prevent adulteration of food and drink, the adulteration and deception in the sale of dairy products, and drugs and medicines, and any violation of the law for the prevention of cruelty to animals, or under section sixty-nine hundred and eighty-four of the Revised Statutes, or section sixty-nine hundred and eighty-four-*a* thereof as herein enacted. If such prosecutions be before a justice of the peace, and a trial by jury be not waived, the said justice shall issue a venire to any constable of the county, containing the names of sixteen electors of the county to serve as jurors to try such case and make due return thereof. Each party shall be entitled to two peremptory challenges, and shall be subject to the same challenges as jurors are subject to in criminal cases in the court of common pleas. If the venire of sixteen names be exhausted without obtaining the required number to fill the panel, the justice may direct the constable to summon any of the bystanders to act as jurors: *Provided*, That in all cases prosecuted under the provision of this section no costs shall be required to be advanced or paid by the person or persons authorized under the law to prosecute such cases: *And provided further*, That in all cases brought under the provision of this section, if the defendant be acquitted, or if convicted and committed in default of paying fine and costs, the costs of each case shall be certified under

<sup>1</sup> Appropriation for 1900, \$50,340.

<sup>2</sup> The supreme court of Ohio has upheld the law requiring that oleomargarine shall not be colored to resemble butter.

oath to the county auditor, who, after correcting the same, shall issue [a] warrant on the county treasurer in favor of the person or persons to whom such cost and fees shall be paid.

And in cases brought for any violation of law for the prevention of cruelty to animals, the humane society or their agents, may employ an attorney to prosecute the same, who shall be paid for his services out of the county treasury, as the county commissioners may deem just and reasonable.

**Repeal.** In effect. SEC. 2. Said original section 3718a is hereby repealed, and this act shall take [effect] and be in force after its passage.

## OKLAHOMA.

See Fourteenth Annual Report of the Bureau of Animal Industry, page 670, for—

Compiled Statutes, 1893, chapter 25, article 36 (2264), section 16.—Concerning adulteration.

Compiled Statutes, 1893, chapter 25, article 50 (2436, 2437, 2443), sections 1, 2, 8.—Concerning impure provisions and milk.

Compiled Statutes, 1893, chapter 8 (342), section 4.—An act creating a board of health and regulating the practice of medicine. (Took effect December 25, 1890.)

## OREGON.

See Fourteenth Annual Report of the Bureau of Animal Industry, pages 670–673, for—

General Laws, 1893, page 99 (sections 1–20).—An act to prevent the production and sales of unwholesome foods and medicines, and to regulate sales of adulterated foods, drinks, medicines, and fertilizers, and to repeal the act entitled "An act to prevent the production and sales of unwholesome foods, and to regulate the sales of adulterated foods, drinks, and medicines," approved February 25, 1889. (Filed in the office of secretary of State February 21, 1893.) [Most, if not all, of this act appears to be replaced by the following.]

### Recently enacted:

GENERAL LAWS, 1899, page 46.

AN ACT to provide for the election of an Oregon Dairy and Food Commissioner, and to prescribe his duties and qualifications, and to prevent the production and sale of unwholesome food, drinks, medicine and fertilizers; and to repeal an act entitled "An Act to prevent the production and sale of unwholesome foods and medicines, and to regulate sales of adulterated foods, drinks, medicines, and fertilizers." (Approved February 16, 1899.)

Any adulterated food, etc., shall be plainly marked.

SECTION 1. No person or persons shall sell, or expose for sale, or exchange, or have in his or their possession for sale or exchange, any adulterated food,

drink, medicine, or fertilizer, unless the same shall be plainly marked so as to establish its true character and distinguish it from pure articles of food, drink, medicine, or fertilizers, and in any public dining

Notice of use in public eating places. or eating room where adulterated food or drinks are used, the bill of fare shall state the fact in the same size type as is used in printing the body of said bill of fare; or, if no bill of fare is used, then and in that case printed notice thereof shall be posted in a conspicuous place in said dining or eating room so as to be easily seen by anyone entering such room, in which notice shall be stated in large letters the fact that adulterated foods and

Reworked butter to be marked "Process butter."

drinks are being used for foods and drinks; and it shall be unlawful for any person to offer or expose for sale reworked or mixed butter, unless the same is plainly

marked "process butter," and it shall be unlawful for any persons to offer or Remolded butter to be marked "Tub butter." expose for sale any tub or packed butter remolded into prints, rolls or squares unless the same is plainly marked "tub butter;" and it shall be unlawful for any person

Creamery stamps on such forbidden. who offers or exposes reworked, mixed, packed, or remolded butter to mark or brand such butter with the stamp of any creamery or with the words "creamery butter."

Stabling of cows. SEC. 2. When cows are kept by any person for dairy purposes, either for butter or cheese, or for the production of milk or cream, for sale, and are confined in stables, such cows so confined shall each be allowed

at least 800 cubic feet of air, and such cows so stabled shall not be confined facing each other or when closer together than six feet, unless there shall be an air-tight partition between such cows at least four feet in height; and all stables where such cows are kept shall be well ventilated and kept in good, healthful condition;

**Care of dairies.** and if any suspected diseased cow or other animal belongs to or about any dairy, the State dairy and food commissioner shall notify the State veterinarian; and if any dairy above stated is found to be in a filthy and unhealthful condition, the commissioner may notify the proprietor that said dairy must be put in a healthful condition within three days, and should said proprietor neglect or refuse to comply with such order, then the commissioners may employ other persons to perform such duty, and said proprietor shall pay all expenses of such labor.

**Penalty.** SEC. 3. Whosoever violates any of the provisions of this act shall be guilty of a misdemeanor, and upon conviction thereof shall be punished by a fine of not less than \$25 nor more than \$100, or by imprisonment in the county jail not less than 30 days nor more than six months. Justices' courts shall have jurisdiction of all cases arising under this act.

**Adulteration defined.** SEC. 4. An article of food or drink or medicine is deemed to be adulterated within the meaning of this act, when:

1. Any substance or substances have been mixed with it so as to reduce or lower or injuriously affect its quality or strength.

2. If any inferior or cheaper substance or substances have been substituted, wholly or in part for it.

3. If any valuable constituent has been wholly or in part abstracted from it.

4. If it is an imitation of or is sold under the name of another article.

5. If it is colored, coated, or powdered or polished, whereby damage is concealed, or if it is made to appear better or of greater value, as compared with the total solids, than it really is: *Provided, however,* That salt and annatto, or butter color, in which annatto is the principal ingredient, shall not be considered an adulteration when used in dairy products.

**Butter standard.** 6. Butter that contains more than 14 per cent water.

**Milk standard.** 7. Milk that contains more than 8 per cent water.

8. Milk that contains less than 3 per cent butter fat.

9. Milk that contains less than 8 per cent solids, other than butter fat, and less than 1.08 specific gravity after cream has been removed.

**Cheese standard.** 10. Cheese that contains less than 40 per cent butter fat, as compared with total solids.

**Cream standard.** 11. Cream that contains less than 20 per cent butter fat.

**Condensed milk standard.** 12. Condensed milk that contains less than 12 per cent of milk solids in pure milk, 25 per cent of which shall be pure fat.

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**Dairy and food commissioner; term; salary.** SEC. 5. That at the general election held in June, 1900, there shall be elected by the electors of the State of Oregon a commissioner, who shall be known as the Oregon dairy and food commissioner, who shall hold his office for the term of four years, and until his successor is elected and qualified, who shall qualify within 30 days from the time of his election by taking and filing an oath to faithfully perform the duties of said office with the secretary of State, and shall receive for his salary the sum of \$1,000 per year and his actual traveling expenses and the expenses incurred in the discharge of the duties of said office: *Provided,* That at the regular session of the legislative assembly now in session there shall be elected, as provided by law, a commissioner who shall be known as the Oregon dairy and food commissioner, who shall hold his office until the election of said commissioner by the electors of the State of Oregon and until such commissioner shall have qualified as aforesaid. The person elected as such commissioner shall

**Qualifications and duties.** be well qualified in dairy matters, and qualified to give theoretical and practical instruction in dairying; and it shall be the duty of such commissioner to give practical and theoretical instructions in dairy matters, whenever and wherever opportunity offers within the State, and to collect and disseminate such information as is calculated to develop the dairy interests within the State. The said commissioner shall establish his office in the city of Portland, in this State, and shall, upon complaint being made by any citizen of the State of Oregon, or without such complaint if in his opinion necessary, examine into any case of violation or of supposed violation of the provisions of this act or any of them. The said commissioner may appoint one deputy in each county in this State, said deputy's duties and compensation to be pre-

**Deputies.**



scribed by the commissioner; said deputy or deputies to be compensated by the commissioner. It shall be the duty of said commissioner to visit and inspect each and every creamery operated within the State of Oregon at least once each year.

**Chemist of agricultural college to assist.** SEC. 6. It shall be the duty of the chemist of the State agricultural college to correctly analyze any and all substances the said commissioner may send him for the purpose of carrying out the provisions of this act, and his certificate of analysis shall be prima facie evidence in all courts of justice.

**Authority for inspections.** SEC. 7. The said commissioner, and such chemists and experts or agents as he shall duly authorize for the purpose, shall have access to, egress, and ingress to, all places of business, factories, stores, farm buildings, carriages, cars, vessels, and implements used in the manufacture, production, or sale of any food, drinks, or medicines or fertilizers; and they also have the power and authority to open any package, case, or vessel containing such articles which may be manufactured, sold, or exposed for sale; and any manufacturer, dealer hotel, or restaurant keeper shall deliver to the commissioner, or his deputy, any samples of food, drinks, or medicines or fertilizers for analyzing or testing upon a tender of the price thereof in money.

**Commissioner reports to the legislature.** SEC. 8. Said commissioner shall keep a full and correct account of all business done by him or his experts, chemists, or agents, and report the same to the legislature.

**Fines to go to common school fund.** SEC. 9. In all prosecutions under this act the fine or fines collected by and under the same shall go to the common school fund of the State; provided, that all such moneys shall be transmitted to the State treasury at the State capital by the officer collecting the same: *Provided, further,* That the State treasurer shall forward a duly certified receipt and shall credit all such accounts to the common school fund.

**Impure milk defined.** SEC. 10. In all prosecutions under the provisions of this act relating to the sale of diseased foods, or that which is unclean, impure or unhealthy, milk drawn from cows for 15 days before and 5 days next after parturition, or from cows fed on unwholesome food, or any calf that has been slaughtered under the age of four weeks, shall be deemed and declared unclean, impure, and unwholesome.

**Use of false brands.** SEC. 11. Any person who shall use the box, boxes, or brands used by any creamery or dairyman for the purpose of selling the butter of any other creamery or dairyman shall be subject to all the fines and penalties provided for in this act.

**Sales of imitation dairy products to be recorded.** SEC. 12. Every person who sells oleomargarine, butterine, or any imitation butter whatsoever, or other imitation dairy products, in this State, shall keep a sale book in which all sales shall be entered at the time of sale. Said sale book shall state the amount sold, together with the name and address of the purchaser, and said sale book shall be open to the inspection of the State food commissioner or his agents at all times.

**Transportation companies to give information.** SEC. 13. Every railroad company or other transportation company in this State, upon application of the State food commissioner or his authorized agent, shall give the name and address of any shipper or consignee of any supposed diseased meats or foods of any kind.

**Annual reports from butter and cheese makers.** SEC. 14. Every person or company who manufactures for sale, in quantities exceeding 25 pounds per week, butter or cheese in this State, shall report to the food commissioner annually each year, as follows:

First—Name and address of manufacturer.

Second—Name and address of owner of cows.

Third—Number of pounds of milk purchased.

Fourth—Total number of pounds of milk used in the manufacture of butter, and the number of pounds used in making cheese.

Fifth—Number of pounds of butter and cheese made.

Sixth—Number of pounds of butter and cheese sold: *Provided,* That the amount



of butter or cheese made by any such person shall not be published if the maker requests that it shall not be done.

Repeal. SEC. 16. All acts and parts of acts in conflict with the above provisions of this act are hereby repealed.

#### PENNSYLVANIA.<sup>1</sup>

See Fourteenth Annual Report of the Bureau of Animal Industry, pages 673-680, for—

Session of 1893, No. 96 (sections 1-7).—An act to enlarge the powers of the State board of agriculture, to authorize the said board to enforce the provisions of the act entitled "An act for the protection of the public health and to prevent adulteration of dairy products and fraud in the sale thereof," approved May 21, A. D. 1885, and of other acts in relation to dairy products; to authorize the appointment of an agent of the said board who shall be known as the "dairy and food commissioner," and to define his duties and fix his compensation, being supplementary to an act entitled "An act to establish a State board of agriculture," approved May 8, A. D. 1876. (Approved May 26, 1893.)

Session of 1895, No. 8, section 4.—An act to establish a department of agriculture and to define its duties and provide for its proper administration. (Approved March 13, 1895.)

Session of 1895, No. 457 (section 1).—An act to enlarge the duties of the State food commissioner, authorizing him to enforce all laws against the adulterations or impurities in vinegar, jellies, cider, evaporated apples and all apple products, and the unlawful labeling in the State of Pennsylvania. (Approved July 5, 1895.)

Session of 1897, No. 118 (sections 1-4).—An act to prohibit the adulteration or coloring of milk or cream by the addition of so-called preservatives or coloring matter, and to provide for the enforcement of the same. (Approved June 10, 1897.)

Session of 1885, No. 186 (sections 1-9).—An act to prevent the adulteration of and the traffic in impure and unwholesome milk in cities of the second and third class. (Approved July 7, 1885.)

Session of 1869, No. 56 (section 1).—An act to authorize the councils in cities and boroughs in this Commonwealth to provide for the inspection of milk. (Approved April 20, 1869.)

Session of 1878, No. 183 (sections 1-6).—An act to prevent the adulteration of milk and prevent the traffic in impure and unwholesome milk. (Approved May 25, 1878.)

Session of 1895, No. 258, sections 14-17.—An act creating a bureau of health in the department of public safety in cities of the second class. (Approved June 26, 1895.)

Session of 1897, No. 164 (sections 1-4).—An act to prevent fraud and deception in the manufacture and sale of cheese and defining what shall constitute the various grades of cheese, providing rules and regulations for marking and branding the same, providing for the enforcement of this act, prescribing penalties for its violation. (Approved June 23, 1897.)

Session of 1893, No. 65 (sections 1-3).—An act to prohibit the use of any adulteration or imitation of dairy products in any charitable or penal institution, being supplementary to an act entitled "An act for the protection of the public health and to prevent adulteration of dairy products and fraud in the sale thereof," approved May 21, A. D. 1885. (Approved May 23, 1893.)

Session of 1895, No. 233 (sections 1-6).—An act to provide against the adulteration of food and providing for the enforcement thereof. (Approved June 26, 1895.)

[The State department of agriculture reports that No. 236, session of 1895, concerning preservatives, was repealed by No. 118, session of 1897; and No. 25, session of 1885, concerning imitations of butter and cheese, was repealed by No. 136, session of 1899.]

<sup>1</sup> A part of the laws relate especially to the milk supply of certain classes of cities, and their enforcement is in the charge of the authorities of the cities concerned.

## Recently enacted:

SESSION OF 1899, NO. 121.

AN ACT to regulate the sale of butter produced by taking original packing stock and other butter and melting the same, so that the butter oil can be drawn off, mixed with skimmed milk or other material, and by emulsion or other process produce butter, and butter produced by any similar process, and commonly known as "Boiled" or "Process" butter; providing for the enforcement thereof, and punishment for the violation of the same. (Approved May 4, 1899.)

SECTION 1. That no person, firm, or corporate body shall, within this State, sell, or offer or expose for sale, or have in his, her, or their possession with intent to sell, any butter not labeled in compliance with the provisions of this act. Butter

Butter produced from melted butter, etc., to be labeled "Renovated Butter."

produced by taking original packing stock and other butter and melting the same, so that the butter oil can be drawn off, mixed

with skimmed milk or other material, and by emulsion or other process produce butter, and butter produced by any similar process, and commonly known as "Boiled" or "Process" butter, shall before sale, and before being offered or exposed for sale, and while in the possession of any person, firm, or corporate body with intent to sell the same, be plainly labeled "Renovated Butter," in the manner prescribed by this act. If sold, offered or exposed for sale, or in

possession of any person, firm, or corporate body with intent to sell the same in prints or rolls, the prints or rolls shall be covered by wrappers, on which shall be printed in conspicuous letters the words "Renovated Butter." If packed in tubs or other receptacles, and sold or offered or exposed for sale, or held in the possession of any person, firm, or corporate body with intent to sell the same, the said words shall be printed in one-inch letters on the top and two sides of the tub or receptacle; if uncovered and not contained in a tub or other receptacle, and sold or offered or exposed for sale, or held in the possession of any person, firm, or corporate body with intent to sell the same, a placard containing the said words shall be attached to the mass, in a manner making them plain and prominent.

PENALTY. SEC. 2. Every person, firm, or corporate body who shall violate any of the provisions of this act shall, for every such offense, forfeit, and pay not less than twenty-five dollars nor more than one hundred dollars, which shall be recoverable with costs, including expense of inspection and analysis, by any person suing in the name of the Commonwealth, as debts of like amount are by law

Enforcement. recoverable: *Provided*, That the Department of Agr culture, through its officer known as the Dairy and Food Commissioner, together with the deputies, agents, and assistants, shall be charged with the enforcement of this act, and shall have full access to all places of business, factories, buildings, carriages, cars, vessels, barrels, and packages of whatever kind, used in the manufacture and transportation and sale of any butter, or of any adulteration or imitation thereof. They shall also have power and authority to open any pack-

Authority for inspections. age, barrel, or vessel containing any butter, or any adulteration or imitation thereof, which may be manufactured, sold, or offered or exposed for sale, or held in possession with intent of the holder

Samples for analysis. to sell; and they shall also have full power and authority to take the samples therefrom for analysis, upon tendering the value of said samples. And all charges, accounts, and expenses

Payment of expenses. of the Department for the enforcement of this act, through the said commissioner and his deputies, agents, assistants, chemists, and counsel employed by him in carrying out the provisions of this act, shall be paid by the Treasurer of the State in the same manner as other accounts and expenses of the said Department are paid. And all penalties and costs for the violation of the provisions of this act shall be paid to the said Dairy and Food Commissioner, or his agents, and by him immediately covered into the State Treasury.

PENALTY. SEC. 3. Every person who violates any of the provisions of this act shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be punished by a fine of not more than one hundred dollars, or by imprisonment in the county jail for not more than thirty days, or both fine and imprisonment, for the first offense: and a fine of one hundred dollars and imprisonment for thirty days, for every subsequent offense: *Provided*, That all fines and costs, including the expense of inspection and analysis imposed under this section, shall be covered

Forfeiture for violation. into the State Treasury, as provided by section two of this act; and all butter sold or offered or exposed for sale, or held in the possession of any one with intent to sell the same, in violation of the provisions of this act shall be subject to forfeiture and spoliation.

**Jurisdiction of magistrates and justices.** SEC. 4. Magistrates and justices of the peace throughout this Commonwealth shall have jurisdiction to hear and determine actions arising for violations of the provisions of this act, and to hold for court or impose the penalties provided therein, subject to appeal as the law shall direct.

SESSION OF 1899, No. 136.

AN ACT to regulate the manufacture and sale of oleomargarine and butterine and other similar products, to prevent fraud and deception by the manufacture and sale thereof as an imitation of butter, the licensing of manufacturers of and dealers in the same, and providing punishment for violations of the act and the means for its enforcement. (Approved May 5, 1899.)

**Imitation butter prohibited.** SEC. 1. That no person, firm, or corporate body, by himself, herself, or themselves, or by his, her, or their agents or servants, shall render or manufacture, sell, ship, consign, offer for sale, expose for sale, or have in his, her, or their possession, with intent to sell, any article, product, or compound made wholly or partly out of any fat, oil, or oleaginous substance, or compound thereof, not produced from unadulterated milk or cream from the same, without the admixture or addition of any fat foreign to the said milk or cream, and which shall be in imitation of yellow butter, produced from pure, unadulterated milk or cream of the same, with or without coloring matter:

**Oleomargarine permitted if uncolored, etc.** *Provided,* That nothing in this act shall be construed to prohibit the manufacture or sale, or offering or exposing for sale, or having in possession with intent to sell, oleomargarine or butterine or any similar substance, free from coloration or ingredients that cause it to look like butter, and in a separate and distinct form, and in such manner as will advise the consumer of its real character, if the person, firm, or corporate body who shall manufacture, sell, or offer or expose for sale, or have in his, her, or their possession, with intent to sell, any of the said substances, shall first obtain a license, and pay a license fee, as hereinafter provided, and shall in all other respects comply with the provisions of this act.

**Manufacturers and sellers to be licensed.**

**Packages to be marked.** SEC. 2. It shall be unlawful for any person, firm, or corporate body to sell, or offer or expose for sale, or have in possession with intent to sell, oleomargarine, butterine or any similar substance, not marked and distinguished on the outside of each tub, package, or parcel thereof, in a conspicuous place, by a placard with the word "oleomargarine" or "butterine," and not having also upon every open tub, package, or parcel thereof, in a conspicuous place, a placard with the word "oleomargarine" or "butterine," such placard in each case to be printed in plain, uncondensed Gothic letters, not less than one inch long, and such placard shall not contain any other words thereon, and every print or roll shall be wrapped in wrappers plainly stamped on the outside thereof with the words "oleomargarine" or "butterine," and where oleomargarine or butterine or other similar product is sold from solid packages, before being delivered to the purchaser it shall be wrapped by the seller thereof in a wrapper plainly stamped on the outside thereof "oleomargarine" or "butterine," and said wrapper shall contain no other words.

**Placards to be displayed.**

**Small parcels to be wrapped in stamped wrappers.**

**Manufacturers and dealers to obtain a license.** SEC. 3. Every person, firm, or corporate body, and every agent of such person, firm, or corporate body, who shall manufacture, sell, or offer or expose for sale, or have in his, her, or their possession with intent to sell, oleomargarine, butterine, or any similar substance, shall first obtain from the Department of Agriculture through its agent, the Dairy and Food Commissioner, a license authorizing him, her or them to engage in the manufacture or sale of oleomargarine or butterine or similar substance, for which said license he, she, or they shall pay, if a manufacturer, the annual sum of one thousand dollars; if a wholesaler, the annual sum of five hundred dollars; and if a retailer, the annual sum of one hundred dollars; if a restaurant keeper, or a hotel proprietor, the annual sum of fifty dollars; and if a boarding-house keeper, the annual sum of ten dollars; and the said license fee when received by the Dairy and Food Commissioner or his agent shall be by him immediately covered into the State Treasury. And after obtaining the license required by this section, before any person, firm or corporate body shall manufacture, sell, or offer or expose for sale, or have in his, her, or their possession with intention to sell, oleomargarine or butterine or any similar sub-



**Signs to be obtained from commissioner.** stance, he, she, or they shall be required to procure from the Department of Agriculture, through the Dairy and Food Commissioner, a sign or signs, as the Dairy and Food Commissioner shall determine, which in size and lettering shall be as the Dairy and Food Commissioner shall direct, and shall be uniform throughout the Commonwealth, clearly setting forth that he, she, or they are engaged in the manufacture or sale of oleomargarine or butterine or any other similar substances, as the

**Signs to be conspicuously hung.** case may be, which said sign or signs, when procured, shall be hung up in a conspicuous place or places on the walls of the rooms or store in which the oleomargarine or butterine or other similar substance is manufactured or sold; *Provided*, That peddlers and others

**Delivery vehicles to be marked.** who may have obtained a license as herein required, and who shall sell, offer or expose for sale, or have in their possession with the intent to sell, oleomargarine or butterine or any similar substance, upon the public streets or ways, may sell or offer or expose for sale, or have in their possession with intent to sell, the same, if the cart, wagon or vehicle, or receptacle in which the oleomargarine or butterine or other substance is contained, is marked or placarded on two sides of the exterior of said vehicle or receptacle in uncondensed Gothic letters, not less than four inches in length, with the words "Licensed to sell oleomargarine" or "Licensed to sell butterine," and if they shall in all other respects comply with the provisions of this act. All

**Licenses expire December 31.** licenses under this act shall expire on the thirty-first day of December of each year; but licenses may be granted the first of any month for the remainder of a year upon the payment of a proportionate part of an annual license fee. Wholesale dealers within the meaning of this

**Wholesale and retail dealers defined.** act, shall be all persons, firms, and corporate bodies who shall sell to dealers, and persons who shall buy to sell again, and all persons, firms and corporate bodies who make sales in quantities of ten pounds and over at any time; and retail dealers shall be all persons, firms and corporate bodies who shall sell in quantities less than ten pounds.

**Penalty.** SEC. 4. Every person, firm, or corporate body who shall manufacture, sell, or offer or expose for sale, or have in his, her, or their possession with intent to sell, oleomargarine or butterine or any similar substance, in violation of any of the provisions of this act, or who shall in any other respect violate any of its provisions, shall for every such offense forfeit and pay the sum of one hundred dollars, which shall be recoverable, with the costs, including the expense of inspection and analysis, by any person suing in the name of the Commonwealth,

**Justices of the peace and aldermen have jurisdiction.** as debts of like amount are by law recoverable; and justices of the peace and aldermen throughout this Commonwealth shall have jurisdiction to hear and

determine all actions for recovery of penalties, with the right of appeal in either party to the court of common pleas, as provided in existing laws in suits for penalties; and all penalties and costs imposed and

**Penalties go to State treasury.** recovered under the provisions of this act shall be paid to the Dairy and Food Commissioner or his agent, and by him immediately covered into the State Treasury. Any person, firm, or corporation who shall manufacture, sell, offer or expose for sale, or have in his, her, or their possession with intent to sell, oleomargarine or butterine or any other similar substance, in violation of any of the provisions of this act, or who shall in any other respect

**Penalty.** violate any of its provisions, shall also be guilty of a misdemeanor, and upon conviction thereof shall be punished for the first offense by a fine of not less than one hundred dollars nor more than five hundred dollars, and upon his conviction for any subsequent offense shall be punished by a fine not less than one hundred and fifty dollars nor more than five hundred dollars, or by imprisonment in the county jail for not less than ten days nor more than sixty days, or by both fine and imprisonment, at the discretion of the court; and all fines im-

**Fines to go to treasury.** posed upon any person after conviction shall be paid to the Dairy and Food Commissioner or his agent, and by him paid into the State Treasury.

**The commissioner charged with enforcement of act.** SEC. 5. The Dairy and Food Commissioner shall be charged with enforcement of all the provisions of this act, and shall have the same power to enforce its provisions that is given him to enforce the provisions of the act by which he receives his appointment.

**Moneys paid under act to constitute a special fund.** SEC. 6. The moneys paid into the treasury under the provisions of this act shall constitute a special fund for the use of the Department of Agriculture



in enforcing this law, and may be drawn out upon warrants signed by the Secretary of Agriculture and approved by the Auditor General.

**Repeal.** SEC. 7. All acts or parts of acts inconsistent with this act are hereby repealed, but the repeal of said acts is not in any way to interfere with or prevent the prosecution to final termination of any actions, civil or criminal, now pending for violations of said acts.

## RHODE ISLAND.

See Fourteenth Annual Report of the Bureau of Animal Industry, pages 680-683, for—

General laws of 1896, chapter 146 (sections 1-5).—Concerning butter tubs and oleomargarine.

General laws of 1896, chapter 147 (sections 1-13).—Concerning milk, milk measures, and milk inspectors.

Laws of 1896, chapter 333 (sections 1-3).—An act in amendment of and in addition to chapter 147 of the general laws, entitled "Of milk." (Passed May 13, 1896.)

Recently enacted:

### LAWS OF 1900, Chapter 785.

AN ACT in amendment of and in addition to chapter 333 of the public laws, entitled "An act in amendment of and in addition to chapter 147 of the general laws, entitled 'Of milk,'" passed at the January session, 1896. (Passed May 31, 1900.)

**Providence inspectors may appoint two collectors of samples.** SECTION 1. Any inspector of milk in the city of Providence now in office, or hereafter elected under authority of Chapter 147 of the General Laws, entitled "Of milk," or of any act in amendment thereof or in addition thereto, may appoint, subject to the approval of the mayor and aldermen of said city of Providence, two persons as collectors of samples, each of whom shall have the same powers and be subject to the same duties and liabilities provided by law relative to collectors authorized by the provisions of Chapter 333 of the Public Laws, entitled "An act in amendment of and in addition to Chapter 147 of the General Laws, entitled 'Of Milk,'" passed at the January session, A. D. 1896. All specimens or samples taken and retained by any such collector shall be delivered to such inspector, who shall have the same powers and duties relative to the same as in case of specimens or samples taken by himself; such inspector may at any time dismiss any such collector and, subject to the approval aforesaid, appoint another person in his stead. Each such collector, upon appointment, shall be duly engaged to the faithful discharge of his duties before the city clerk of said city, who shall keep a record thereof, and shall receive such salary as the mayor and aldermen of said city shall determine.

SEC. 2. All acts and parts of acts inconsistent herewith are hereby repealed, and this act shall take effect from and after its passage.

## SOUTH CAROLINA.

See Fourteenth Annual Report of the Bureau of Animal Industry, pages 683 and 684, for—

Acts of 1896, No. 96 (sections 1-14).—An act to regulate the sale of milk, *butter*, and cheese, and to prescribe penalties for the unlawful sale or exposure for sale of any watered or adulterated or unwholesome milk and imitations or adulterations of butter and cheese. (Approved March 9, 1896.)

## SOUTH DAKOTA.

See Fourteenth Annual Report of the Bureau of Animal Industry, pages 684 and 685, for—

Compiled Laws of Dakota, 1887, Political Code, Article 5, sections 2250 and 2251.—Concerning health officers and butter and cheese.

Laws of 1897, chapter 65 (sections 1-6).—An act to amend sections 2246, 2248, and 2249 of the Compiled Laws of 1887, the same being sections 1, 3, and 4, chap-

ter 64, session laws of 1885, relating to adulteration of food and drink. (Approved March 3, 1897.)

## Recently enacted:

### LAWS OF 1899, Chapter 89.

AN ACT relating to the manufacture, sale, compounding, or adulteration of lard, or any compounds or substitutes thereof, food, jellies, spices, and condiments, baking powders, vinegars, honey, candy, and other articles of food, to prevent fraud and to preserve the public health. (Approved February 23, 1899.)

\* \* \* \* \*

**Adulterated food to be labeled.** SEC. 23. It shall be unlawful for any person or persons to offer for sale to the residents of this State, or have in their possession with intent to sell, sell, or cause to be sold, any article of food whatsoever that is adulterated, unless the package containing the same bears a label upon the outside and face of said package on which is distinctly printed, in the English language, and in legible type not smaller than double pica, the name and location of the person, firm or corporation manufacturing the same, the word "adulterated," and immediately following and below this word the common English name of the article of food which the box or package contains.

**Evidence of violation.** SEC. 24. The having in possession by any firm, person, or corporation any article or substance hereinbefore described and referred to as adulterated or mixed and which is not labeled as hereinbefore required and directed, shall be considered as prima facie evidence that the same is kept by such person, firm, or corporation in direct violation of the provisions of this Act.

**Chemist's certificate.** SEC. 25. In all prosecutions arising under this Act, the certificate of the chemist making the analysis, when duly sworn to by such analyst, shall be prima facie evidence of the fact or facts as therein certified.

**Adulterated food defined.** SEC. 26. Any article of food shall, for the purpose of this Act be deemed adulterated:

1. If any substance or substances shall have been mixed with an article of food so as to lower or depreciate its quality, strength, or purity.
2. If any cheaper or inferior substance or substances have been substituted wholly or in part for it.
3. If any valuable or necessary constituent or ingredient has been wholly or in part abstracted from it.
4. If it is an imitation of, or sold or represented for sale under the name of, any other substance or article.
5. If it is colored, powdered, or treated in any manner whereby damage or inferiority is concealed.
6. If it contains any added substance or ingredient which is poisonous or injurious to health.

**Prosecutions.** SEC. 27. In all prosecutions under the various sections of this Act, the cost thereof shall be paid in the manner now provided by law, and it shall be the duty of all prosecuting attorneys to represent and prosecute in behalf of the people, within their respective counties, all such cases of offense arising under the provisions of this Act, and all fines imposed shall be paid into the State treasury: *Provided*, nothing in this Act shall be construed to affect stocks purchased, on hand, and for sale prior to the taking effect of this Act.

**Penalty.** SEC. 28. Any person violating any of the provisions of this Act shall be deemed guilty of a misdemeanor, and upon conviction shall be punished by a fine of not less than twenty-five (25) dollars, nor more than fifty (50) dollars and costs, or by imprisonment in the county jail for not less than thirty days nor more than ninety days.

**Repeal.** SEC. 29. All Acts and parts of Acts in conflict with the provisions of this Act are hereby repealed.

### TENNESSEE.

See Fourteenth Annual Report of the Bureau of Animal Industry, pages 686-688, for—

Acts of 1879, chapter 169 (sections 1-4).—An act to prevent fraud in the sale of butter and cheese. (Approved March 26, 1879.)

Acts of 1895, chapter 101 (sections 1-6).—An act to provide for labeling, stamping, or marking oleomargarine, butterine, and imitation butter, and to provide against coloring the same, and fixing the punishment for violation of this act. (Approved April 10, 1895.)

Public Acts of 1897, chapter 45 (sections 1-8).—An act to prevent the adulteration and misbranding of food and drink and the deception in the sale of the same in Tennessee, and to fix the penalty for the violation of this act. (Approved March 24, 1897.)

## TEXAS.

REVISED STATUTES OF TEXAS, 1895, Title 21, Chapter 2.

ARTICLE 642 [566] The purposes for which private corporations may be formed are—

\* \* \* \* \*

SEC. 52. The establishment and carrying on of dairies and creamery companies.

\* \* \* \* \*

## UTAH.

[Chapter 63, of the Laws of 1894, on page 689, of the Fourteenth Annual Report of the Bureau of Animal Industry, was repealed by section 19 of chapter 60 of the Laws of 1896.]

The following acts are now in force:

LAWS OF 1896, Chapter 60.

AN ACT to prevent deception and fraud in the sale of dairy products and to regulate the sale and manufacture of oleomargarine and similar products and to prohibit the sale of filled cheese and to repeal chapter 63 of the session laws of 1894, Territory of Utah. (Approved March 21, 1896.)

**Sale or delivery of impure milk.** SECTION 1. Any person who shall sell or offer for sale or furnish or deliver, or have in his possession, with intent to sell or offer for sale or furnish or deliver to any creamery, cheese factory, corporation, person or persons whatsoever, as pure, wholesome, and unskimmed, any unmerchantable, adulterated, impure, or unwholesome milk, shall **Penalty.** upon conviction thereof be punished by a fine of not less than ten nor more than one hundred dollars for each and every offense.

**Impure, etc., milk defined.** SEC. 2. In all prosecutions or other proceedings under this or any other law of this State relating to the sale or furnishing of milk, if it shall be proven that the milk sold or offered for sale, or furnished or delivered, or had in possession with intent to sell or offer for sale, or to furnish or deliver as aforesaid, as pure, wholesome, and unskimmed, has been diluted or any part of its cream abstracted, or that it or any part of it was drawn from any cow within twenty days before or five days after parturition or from any cow that has any disease or ulcer or other running sore, then and in either case the said milk shall be held, deemed and adjudged to have been unmerchantable and adulterated, impure, or unwholesome, as the case may be.

**Skim milk to be labeled.** SEC. 3. No person, by himself or by his agents or servants, shall sell, exchange, or deliver, or have in his custody or possession with intent to sell, exchange, or deliver milk from which the cream or any part thereof has been removed, unless in a conspicuous place above the center upon the outside of every vessel, can, or package, from or in which such milk is sold, the words "Skimmed milk" are distinctly marked in uncondensed Gothic letters not less than one inch in length, said skim milk to contain not less than nine per centum of milk solids exclusive of fats. Whoever violates the provisions of this section shall be deemed guilty of a misdemeanor, and shall be punished by a fine of not less than ten nor more than one hundred dollars for each and every offense.

**Kinds of tests for adulteration.** SEC. 4. Proof of adulterations and skimming may be made with such standard tests and lactometers as are used to determine the quality of milk or by chemical analysis.

**Preservatives forbidden.** SEC. 5. Any person who shall sell or offer for sale, consign, or have in his possession with intent to sell to any person or persons, any milk, cream, butter, cheese, or other dairy products, or who shall



deliver to any creamery or cheese factory milk or cream to be manufactured into butter or cheese, to which boracic acid, or salicylic acid, or compounds containing them, or other antiseptics injurious to health, have been added, shall be guilty of a misdemeanor, and upon conviction thereof be punished by a fine of not less than ten nor more than one hundred dollars for each and every offense.

**Filled cheese prohibited.** SEC. 6. No person, by himself or by his agents or servants, shall manufacture, or shall buy, sell, or offer ship, consign, expose, or have in his possession for sale any cheese manufactured from or by the use of skimmed milk to which there has been added any fat which is foreign to such milk.

**Size of skim milk cheese regulated.** SEC. 7. No person, by himself or by his agents or servants, shall manufacture, or shall buy, sell, ship, consign, expose, or have in his possession for sale, within this State any skimmed milk cheese, or cheese manufactured from milk from which any of the fats originally contained therein has been removed, except such cheese is not less than 9 nor more than 11 inches in diameter, and not less than 9 inches in height.

**Imitation of yellow butter prohibited.** SEC. 8. No person, by himself or by his agents or servants, shall render or manufacture, sell, ship, consign, offer for sale, expose for sale, take orders for the future delivery of, or have in his possession with intent to sell, any article, product, or compound made wholly or partly out of any fat, oil, or oleaginous substance or compound thereof, not produced from unadulterated milk or cream from the same, and without the admixture or addition of any fat foreign to said milk or cream, which shall be an imitation of yellow butter produced from pure, unadulterated milk or cream of the same, with or without coloring matter: *Provided*, That nothing in this act shall be construed to prohibit the manufacture or sale of oleomargarine in a separate and distinct form and in such manner as will advise the consumer of its real character free from coloration or ingredient that causes it to look like butter, and free from any word, brand, or marking, either upon the package or upon any wrapper or upon the contents of the same, which would in any wise tend to deceive the purchaser or consumer.

**Sales of substitutes as butter forbidden.** SEC. 9. It shall be unlawful for any person by himself or by his agent to sell or offer for sale to any person who asks, sends, or inquires for butter, any oleomargarine, butterine, or any substance made in imitation or semblance of pure butter not made entirely from the milk of cows, with or without coloring matter.

**Oleomargarine, etc., to be labeled.** SEC. 10. It shall be unlawful for any person to expose for sale oleomargarine, butterine, or any similar substance not marked and distinguished on the outside of each tub, package, or parcel thereof by a placard with the word "oleomargarine" and not having also upon the exposed contents of every open tub, package, or parcel thereof a conspicuous placard with the word "oleomargarine," such placard in each case to be printed in plain, uncondensed Gothic letters not less than one inch long, and such placard shall not contain any other words thereon.

**Signs where oleomargarine is sold.** SEC. 11. It shall be the duty of every person who sells oleomargarine, butterine, or any similar substance, from any dwelling, store, office, or public mart, to have conspicuously posted thereon the placard or sign in letters not less than four inches in length, "oleomargarine sold here" or "butterine sold here." Such placards shall be approved by the dairy and food inspector of the town or city, or if none by the clerk of the county, city recorder or town clerk.

**Signs on wagons.** SEC. 12. It shall be unlawful for any person, by himself or by his agents to peddle, sell, solicit orders for the future delivery of, or deliver from any cart, wagon, or other vehicle, oleomargarine, butterine, or any similar substance, not having on the outside of both sides of said cart, wagon, or other vehicle the placard in uncondensed Gothic letter, not less than three inches in length, "oleomargarine."

**Guests to be notified.** SEC. 13. It shall be unlawful for any person, by himself or by his agents or servants, to furnish or cause to be furnished, in any hotel, boarding house, restaurant, or at any lunch counter, oleomargarine, butterine, or any similar substance to any guest or patron of said hotel, boarding house, restaurant, or lunch counter, without first notifying each guest or patron that the substance so furnished is not butter.



**Penalty.** SEC. 14. Any person who shall violate any of the provisions of sections 6, 7, 8, 9, 10, 11, 12, 13, of this act shall be guilty of a misdemeanor, and upon conviction thereof shall be punished for the first offense by a fine of not less than twenty-five dollars; and upon conviction of any subsequent offense shall be punished by a fine of not less than fifty dollars, or by imprisonment in the county jail for not less than ten days, or by both such fine and imprisonment, at the discretion of the court.

**Pure butter and cheese in State institutions.** SEC. 15. No butter or cheese not made wholly and directly from pure milk or cream, salt, and harmless coloring matter shall be used in any of the charitable or penal institutions of the State. Any person or persons violating any of the provisions of this section of this act, shall, upon conviction thereof, be fined not less than twenty-five or more than fifty dollars for the first offense, or for each subsequent offense not less than fifty nor more than one hundred dollars, or be imprisoned in the county jail not less than ten nor more than sixty days or by both such fine and imprisonment.

**Warrant for unlawful imitations.** SEC. 16. When complaint shall be made on oath to any magistrate authorized to issue warrants in criminal cases, that imitation butter or imitation cheese or any substance designed or intended to be used as a substitute for butter or cheese, is in the possession or under the control of any person or persons contrary to the provisions of law of this State, and that the complainant believes that it is concealed in any particular warehouse, store, or refrigerator for mercantile purposes, the magistrate, if he be satisfied that there is cause for such belief, shall issue a warrant for such property.

**Search warrants described.** SEC. 17. All such warrants shall be directed to the sheriff of the county or his deputy or to any constable of the county, commanding such officer to search the house, building, store, or other place where imitation butter or imitation cheese or any substance designed or intended to be used as imitation butter or cheese for which he is required to search is believed to be concealed, which place and property to be searched for shall be designated and described in the warrant, and to bring such property when found and the person or persons in whose possession the same shall be found before the magistrate who issued the warrant or before some other magistrate or court having cognizance of the case.

**Disposition of articles seized.** SEC. 18. When any officer in the execution of a search warrant under the provisions of this act shall find any imitation butter or cheese, or any substance designed or intended to be used as an imitation for butter or cheese and for which a search is allowed by this act, all the property so seized shall be safely kept by the direction of the court or magistrate, so long as shall be necessary for the purpose of being produced as evidence on any trial: *Provided*, That it shall be the duty of the officer who serves a search war-

**Analyses to be made.** rant issued for imitation butter and imitation cheese or any substance designed or intended to be used as imitation butter or cheese and alleged to be in his possession or under the control of any person or persons contrary to law, to deliver to any person authorized in writing to receive the same, a true and perfect sample of each article seized by virtue of such warrant, for the purpose of having the same analyzed: such analysis to be made by a chemist of any State institution and the result of such analysis or test shall be recorded and preserved as evidence, and the expense of such analysis or test, not exceeding twenty dollars in any one case may be included in the cost of such

**Confiscation.** prosecution. If any sample be found to be imitation butter or imitation cheese, or substance designed or intended to be used as an imitation for butter or cheese, and that the same, at the time of such seizure, was in the possession or under the control of any person or persons contrary to any of the provisions or requirements of this act, then and in such case the property so seized shall be confiscated under the direction of the court or magistrate: otherwise the said property shall be forthwith returned to the person or persons from whom it was taken.

**Repeal.** SEC. 19. Chapter 63 of the Session Laws of 1894, of the Legislative Assembly of the Territory of Utah is hereby repealed.

#### LAWS OF 1897, Chapter 54.

AN ACT Providing for a State Dairy and Food Commissioner, and Defining the Duties thereof. (Approved March 11th, 1897.)

**Dairy and food commissioner.** SECTION 1. The office of Dairy and Food Commissioner for the State of Utah is hereby created. Such commis-

sioner shall be appointed by the Governor (by and with the consent of the Senate) and his term of office shall be for two years from the date of his appointment: *Provided*, That the term of office of the commissioner first appointed under this act shall expire on the first Monday in March, 1899, and vacancies occurring in the office for any cause shall be filled by appointment for the balance of the unexpired term. The salary of the commissioner shall be \$600 per annum, together with his necessary and actual expenses incurred in the discharge of his official duty; which shall be paid in the same manner as to other State officers: *Provided*, That said expenses shall not exceed \$300 in any one year, and a statement of these expenses with the proper vouchers attached shall be filed with the State auditor on or before December 31st of each year.

**His duties.** SEC. 2. It shall be the duty of the commissioner and he is hereby invested with the powers to enforce all laws that now exist or that may hereafter be enacted in this State, regarding the production, manufacture, or sale of dairy products or the adulteration of any article of food or drink or of any drug, and personally (or by his deputy) to inspect any article of milk, butter, cheese, meat, vegetable, lard, syrup, coffee, or tea, or any other article of food or drink made or offered for sale within this State, which he may suspect or have reason to believe to be impure, unhealthy, adulterated, or counterfeit and to prosecute or cause to be prosecuted any person or persons, firm or firms, corporation or corporations engaged in the manufacture or sale of any unwholesome adulterated or counterfeit article or articles of food or drink, or drug contrary to the laws of the State.

**Power of commissioner.** SEC. 3. Said commissioner shall have power in the performance of his official duties to enter into any creamery, factory, store, salesroom, or other place or building where he has reason to believe that any food or drink or drug is made, prepared, sold, or offered for sale, and to open any cask, tub, package, or receptacle of any kind containing or supposed to contain, any such article, and to examine or cause to be examined and analyzed the contents thereof; and the commissioner may seize or take any article of food or drink or drug for analysis, but if the person from whom such sample is taken shall request him to do so he shall at the same time, and in the presence of the person from

**Duplicate samples.** whom such property is taken securely seal up two samples of the article seized or taken, the one of which shall be for examination or analysis under the direction of the commissioner, and the other of which shall be delivered to the person from whom the articles were taken. Any person who

**Penalty for hindrance.** shall obstruct the commissioner by refusing to allow him entrance to any place which he desires to enter in the discharge of his official duty, or who refuses to deliver to him a sample of any article of food or drink or drug made, sold, offered or exposed for sale by such person, when the same is requested and when the value thereof is tendered, shall be deemed guilty of a misdemeanor punishable by a fine of not exceeding twenty-five dollars for the first offense and not exceeding five hundred dollars or less than fifty dollars for each subsequent offense.

**County attorney to assist.** SEC. 4. It shall be the duty of the county attorney in any county of the State, when called upon by the commissioner, to render any legal assistance in his power to execute the laws, and to prosecute cases arising under the provisions of this act; and all fines and assessments collected in any prosecution begun or caused to be begun by said commissioner shall be paid into the State treasury.

**Biennial reports.** SEC. 5. Said commissioner shall make a biennial report to the Governor, which shall contain an itemized account of all expenses incurred and fines collected, with such statistics and other information as he may regard of value; and with the consent of the Governor not exceeding one thousand copies thereof, may be published annually as other official reports are published.

**In effect.** SEC. 6. This act shall take effect upon approval.

## VERMONT.

See Fourteenth Annual Report of the Bureau of Animal Industry, pages 689-691, for—

Vermont Statutes, 1894, sections 4300, 4327-4340, 4975, and 4976.—Concerning milk, butter, cheese, and imitations.

Recently enacted: <sup>1</sup>

LAWS OF 1898, No. 81.

AN ACT for the protection of dairymen, relating to testing milk and cream. (Approved November 19, 1898.)

**Test bottles, etc., to be accurate.** SECTION 1. All bottles, pipettes, or other measuring glasses used by any person, firm, or corporation, or their agents or employees, at any creamery, butter factory, cheese factory, or condensed milk factory, or elsewhere in this State, in determining by the Babcock test, or by any other test, the value of milk or cream received from different persons or parties at such creameries or factories, shall, before such use, be tested for accuracy of measurement and for accuracy of the per cent scale marked thereon. It shall be the duty of the superintendent of the dairy school of the University of Vermont and State Agricultural College to designate some competent person to test the accuracy of such bottles, pipettes or other measuring glasses. The person thus designated shall so mark such bottles, pipettes or other measuring glasses as are found correct in marks or characters which can not be erased, which marks or characters shall stand as proof that they have been so tested; and no incorrect bottles, pipettes, or other glasses shall be thus marked. The superintendent of the dairy school shall receive for such service the actual cost incurred and no more, the same to be paid by the persons or corporations for whom it is done.

**Persons making tests as basis for payments to hold certificates.**

SEC. 2. Each and every person who, either for himself or in the employ of any other person, firm, or corporation, manipulates the Babcock test, or any other test, whether mechanical or chemical, for the purpose of measuring the contents of butter fat in milk or cream as a basis for apportioning the value of such milk or cream, or the butter or cheese made from the same, shall secure a certificate from the superintendent of the dairy school of the University of Vermont and State Agricultural College that he or she is competent and well qualified to perform such work. The rules and regulations in the application for such certificate and in the granting of the same shall be such as the superintendent of the school may arrange. The fee for issuing such certificate shall in no case exceed one dollar, the same to be paid by the applicant to the superintendent of the dairy school and to be used by the superintendent in meeting the expenses incurred under this section.

**Complaints and penalties.**

SEC. 3. Any person or persons violating any of the provisions of this act, shall, on conviction in a court of competent jurisdiction be fined not more than twenty-five dollars for the first offense, and not more than fifty dollars for each subsequent offense. It shall be the duty of every sheriff, deputy sheriff, and constable to institute complaint against any person or persons violating any of the provisions of this act, and, on conviction, one-half of the fines shall go to the complainant and the balance to the State.

LAWS OF 1898, No. 82.

AN ACT in relation to creameries and cheese factories and the management of the same (Approved November 29, 1898.)

**Creamery patrons to have monthly statements.**

SECTION 1. Every owner, operator, or manager of a creamery in this State, whether cooperative or proprietary, shall monthly make and deliver to each of the patrons of said creamery a statement of the number of pounds of milk or cream such patron delivers for that month, together with the test, pounds of butter fat, gain per cent from the churn, and actual pounds of butter produced from said milk, and the price paid for the same shall be computed on the actual pounds of butter.

**Milk sold to be reduced to butter.**

SEC. 2. Any owner, operator, or manager of any creamery, whether cooperative or proprietary, who sells or otherwise disposes of any of the milk received at such creamery, shall weigh and carefully sample the same, and shall test such samples, for the purpose of ascertaining the number of pounds of butter fat in such milk sold, or otherwise

<sup>1</sup> An act approved November 23, 1900, received too late to be printed in this bulletin, repeals sections 4334-4340 of chapter 183. Vermont Statutes: provides that imitations of and substitutes for butter or cheese shall be plainly labeled; and prohibits the use of such words as "dairy" in marking butter imitations. The State's attorney is given special powers for enforcing.



disposed of, and the gain per cent which is found to be the gain from the churn for that month shall be the one used in ascertaining the actual number of pounds of butter produced from such milk as is sold or otherwise disposed of.

**Cheese factory patrons to have monthly statements.**

SEC. 3. The owner, operator, or manager of any cheese factory in the State, whether co-operative or proprietary, shall make and deliver to each of the patrons of such factory a statement representing the number of pounds of milk he delivers for each month, together with the test and actual number of pounds of cheese produced by such milk for said month. And the price paid for the same shall be computed on actual number of pounds of cheese.

**Monthly statement of operations to be posted in creameries.**

SEC. 4. Every owner, operator, or manager of a creamery in this State, whether co-operative or proprietary, shall make a statement each month of the total number of pounds of milk received for that month, together with the gain per cent from the churn, and actual number of pounds of butter produced from said milk and cream.

**SEC. 5.** The statement mentioned in the preceding section shall be posted in a conspicuous place in said creameries.

**SEC. 6.** Any manager or proprietor of any creamery or cheese factory in the State who after request by any person refuses, or neglects for the space of ten days, to comply with any of the provisions of this act shall forfeit to said person ten dollars for each refusal or neglect, to be recovered by an action founded on this statute.

**SEC. 7.** This act shall take effect January 1, 1899.

#### LAWS OF 1898, No. 115.

AN ACT relating to public health. (Approved October 26, 1898.)

**State laboratory for examination of milk, etc.**

SECTION 1. The State Board of Health is authorized to establish and equip with the proper and necessary apparatus, utensils, and instruments a State Bacteriological Laboratory, for the chemical and bacteriological examination of water supplies, milk, and all food products, and the examination of cases and suspected cases of diphtheria, typhoid fever, tuberculosis, malaria, and other infectious and contagious diseases.

**Director and his duties.**

SEC. 2. The State Board of Health shall appoint a director of such Laboratory, who shall hold his office for two years from the first day of December, 1898; and biennially thereafter said Board of Health shall appoint a director of such Laboratory for a similar term. He shall keep a record of all specimens sent to him for examination by residents of the State, and examine these specimens without unnecessary delay. He shall biennially before the first day of January make a full report to the State Board of Health of all matters pertaining to the Laboratory, and shall make such other and special reports as the State Board of Health may ask for. His salary and that of his assistant shall be fixed by the State Board of Health.

SEC. 3. The use of the Laboratory and all investigations therein made shall be free to the people of this State.

**Appropriation.** SEC. 4. The sum of Five Thousand Dollars is hereby appropriated for the purpose of procuring the proper and necessary apparatus, utensils and instruments for the equipment of such laboratory; and the sum of Eight Thousand Dollars per year is hereby appropriated to pay the salaries, procure the necessary supplies, and to meet the other necessary expenses of said laboratory, which sums shall be expended under the supervision of the State Board of Health. The total annual expense of maintaining said laboratory shall not exceed the sum of Eight Thousand Dollars.

**SEC. 5.** This act shall take effect from its passage.

#### VIRGINIA.

See Fourteenth Annual Report of the Bureau of Animal Industry, pages 691-693, for—

Code of 1887, title 25, chapter 84, sections 1871 and 1899-1901.—Concerning butter brands, creameries, sale of imitation butter and cheese.



Acts of 1891-92, chapter 526 (sections 1-7).—An act to prevent the adulteration of butter and cheese and the sale of the same, and preserve the public health. (Approved March 1, 1892.)

Acts of 1897-98, chapter 146 (sections 1-4).—An act to prevent deception in the manufacture and sale of imitation butter. (Approved January 29, 1898.)

Recently enacted:

ACTS OF ASSEMBLY, VIRGINIA, 1899-1900, page 694, Chapter 655.

AN ACT to prevent the sale of adulterated and misbranded food in the State of Virginia. (Approved February 27, 1900.)

**Board of Agriculture to examine foods.** SECTION 1. That for the purpose of protecting the people of the State from imposition by the adulteration and misbranding of articles of food, the board of agriculture shall cause to be procured from time to time, and under the rules and regulations to be prescribed by them, in accordance with section nine of this act, samples of food, beverages, and condiments offered for sale in the State, and shall cause the same to be analyzed or examined microscopically or otherwise by the chemists or other experts of the department of agriculture. The board of agriculture is hereby authorized to make such publications of the results of the examinations, analyses, and so forth, as they may deem proper.

**Adulterated or misbranded food prohibited.** SEC. 2. That no person, by himself, or agent, shall knowingly manufacture, sell, expose for sale, or have in his possession with intent to sell, any article of food which is adulterated or misbranded within the meaning of this act; and any person who shall violate any of the provisions of this act shall be guilty of a misdemeanor, and for such offenses shall be fined not exceeding two hundred dollars for the first offense, and for each subsequent offense not exceeding three hundred dollars, or be confined in jail not exceeding one year, or both, and such fines, less legal costs and charges, shall be paid into the treasury of the State.

**Chemists of Department of Agriculture to assist.** SEC. 3. That the chemists or other experts of the department of agriculture shall make, under rules and regulations prescribed by the board of agriculture, examinations of specimens of food, beverages, and condiments offered for sale in Virginia which may be collected from time to time under their directions in various parts of the State. If it shall appear from such examination that any of the provisions of this act have been violated, the commissioner of agriculture shall at once certify the facts to the commonwealth's attorney for the city or county in which the offense shall have been committed, and furnish that officer with a copy of the result of the analysis duly authenticated by the analyst under oath.

**Commonwealth's attorneys to prosecute.** SEC. 4. That it shall be the duty of every commonwealth's attorney to whom the commissioner of agriculture shall report any violation of this act, to cause proceedings to be commenced and prosecuted without delay for the fines and penalties in such cases provided.

**"Food" and "misbranded," defined.** SEC. 5. That the term "food," as used herein, shall include all articles of food—candy, condiment, or drink, by man or domestic animals, whether simple, mixed or compound. The term "misbranded," as herein used, shall include all articles of food or articles which enter into the composition of food, the package or label of which shall bear any statement purporting to name any ingredients or substances as being contained or not being contained in such article, which statement shall be also in any particular.

**Adulteration defined.** SEC. 6. That for the purpose of this act any article of food shall be deemed adulterated—First. If any substance or substances has or have been mixed or packed with it, so as to reduce or lower or injuriously affect its quality or strength so that such product, when offered for sale, shall deceive or tend to deceive the purchaser. Second. If any inferior substance or substances has or have been substituted wholly or in part for the article so that the product when sold shall deceive or tend to deceive the purchaser. Third. If any valuable constituent has been wholly or in part abstracted, so that the product when sold shall deceive or tend to deceive the purchaser. Fourth. If it be an imitation of and sold under the specific name of another article. Fifth. If it be mixed, colored, powdered, coated, polished, or stained in a manner whereby

damage or inferiority is concealed, so that such product when sold shall deceive or tend to deceive the purchaser. Sixth. If it contain any added poisonous ingredient, or any ingredient which may render such article injurious to the health of the person consuming it. Seventh. If it be labeled or branded so as to deceive or mislead the purchaser, or purport to be a foreign product when branded so, or an imitation either in package or label of an established proprietary product, which has been trade marked or patented. Eighth. If it consists of the whole or any part of a diseased, filthy, decomposed, or putrid animal or vegetable substance, or any portion of an animal unfit for food, whether manufactured or not, or if it is the product of a diseased animal or of an animal that has died otherwise than by slaughter. \* \* \* *Provided*, That an article of food, beverage, or condiment which does not contain any added poisonous ingredient shall not be deemed to be adulterated in the following cases: First. In the case of articles, mixtures, or compounds which may be now, or from time to time hereafter, known as articles of food, beverages or condiments under their own distinctive names and not included in definition fourth of this section. Second. In the case of articles labeled, branded, or tagged so as to plainly indicate that they are mixtures, compounds, combinations, imitations, or blends. Third. When any matter or ingredient has been added to the food, beverage, or condiment because the same is required for the production or preparation thereof as an article of commerce in a state fit for carriage or consumption and not fraudulently to increase the bulk, weight, or measure of the food, beverage, or condiment, or conceal the inferior quality thereof: *Provided*, That the same shall be labeled, branded, or tagged as prescribed by the board of agriculture, so as to show them to be compounds and the exact character thereof: \* \* \* Fourth. Where the food, beverage, or condiment is unavoidably mixed with some harmless extraneous matter in the process of collection or preparation: *Provided further*, That no person shall be convicted under the provisions of this act when he is able to prove a written guaranty of purity in a form approved by the board of agriculture as published in their rules and regulations, signed by the wholesale jobber, manufacturer, or other party from whom he purchased said article.

**Compound, etc., products to be branded.** SEC. 7. That the board of agriculture is hereby authorized to cause all compound, mixed, or blended products to be properly branded, and prescribe how this shall be done.

**Information to be published.** SEC. 8. That it shall be the duty of the board of agriculture to prepare and publish from time to time lists of the articles, mixtures or compounds declared to be exempt from the provisions of this act in accordance with section six. The board of agriculture shall also from time to time fix and publish the limits of variability permissible in any article of food, beverage, or condiment, and these standards, when so published, shall remain the standards before all courts: *Provided*, That when standards have or may be fixed by the secretary of agriculture of the United States they shall be accepted by the board of agriculture, and published as the standards for Virginia.

**Samples for analysis.** SEC. 9. That every person who exposes for sale or delivers to a purchaser any condiment, beverage, or article of food shall furnish, within business hours, and upon tender and full payment of the selling price, a sample of such condiments, beverages, or articles of food to any person duly authorized by the board of agriculture to secure the same, and who shall apply to such manufacturer or vender or person delivering to a purchaser such beverage or article of food, for such sample for such use in sufficient quantity for the analysis of such article or articles in his possession.

**Hindrance, etc.** SEC. 10. That any manufacturer or dealer who refuses to comply upon demand with the requirements of section nine of this act, or any manufacturer, dealer, or person who shall impede, obstruct, hinder, or otherwise prevent or attempt to prevent any chemist, inspector, or other person in the performance of his duty in connection with this act shall be guilty of a misdemeanor, and shall, upon conviction, be fined not less than ten dollars nor more than one hundred dollars, or be imprisoned not more than one hundred days, or both, and said fine less legal cost shall be paid into the treasury of the State.

**No interference with commerce.** SEC. 11. That this act shall not be construed to interfere with commerce, or any interstate commerce laws of the United States.

**Repeal.** SEC. 12. All acts or parts of acts in conflict with this act are, to that extent, hereby repealed.

**In effect.** SEC. 13. This act shall take effect on and from the first day of July, nineteen hundred.

## WASHINGTON.

[Chapter 45, session of 1895 (sections 1-25), on pages 693-696 of the Fourteenth Annual Report of the Bureau of Animal Industry, appears to be superseded and repealed by the first act below.]

Recently enacted:

## LAWS OF 1899, Chapter 43.

AN ACT regulating the manufacture of dairy products, to prevent deception or fraud in the sale of the same or imitation thereof, providing for the appointment of a dairy commissioner and defining his duties, creating a State board of dairy commissioners and defining their duties, imposing certain duties upon the chemists of State institutions, providing penalties for violations of this law, making an appropriation. (Approved March 7, 1899.)

**Unmerchutable, adulterated, etc., milk prohibited.** SECTION 1. It shall be unlawful for any person to sell or offer for sale, or furnish or deliver to any creamery, cheese factory, corporation, person or persons whatsoever, as pure, wholesome, and unskimmed, any unmerchutable, adulterated, skimmed, impure, or unwholesome milk.

SEC. 2. In all prosecutions or other proceedings under this or any other law of this State, relating to the sale or furnishing of milk, if it shall be proven that the milk sold or offered for sale, or furnished or delivered or had in possession with intent to sell or offer for sale, or to furnish or deliver, as aforesaid, as pure, whole-

**Milk standard.** some, or unskimmed milk, contain less than three per centum of pure butter fat, or less than eight per centum of milk solids other than fat, when subject to chemical analysis or other satisfactory tests, or that it, or any part of it, was drawn from cows known by the person complained of to have been within fifteen days before or four days after parturition, or to have any disease or ulcers, or other running sores, then and in either case the said milk shall

**Defining impure, etc., milk and cream.** be held and judged to be unmerchutable, adulterated, impure, or unwholesome, as the case may be, and if it shall appear that cows kept for the production of milk or cream, for market or for sale or exchange, or for manufacturing their milk into articles of food, are kept in a crowded or unhealthy condition, or are being fed on distillery waste or other substance in a state of putrefaction or rotteness, or upon any substance of an unhealthful nature, the milk or cream from same is hereby declared impure and unwholesome. Any milk or cream from the same that has been exposed to or contaminated by emanations, discharges, or exhalations from

**Preservatives.** persons or animals, or to which has been added any borax, boracic acid, salicylic acid, or any other poisonous substance which prevents or tends to prevent the normal bacterial actions of milk, is hereby declared to be impure and unwholesome.

SEC. 3. The Washington State dairy commissioner is hereby authorized and directed to procure and issue to the cheese manufacturers of the State, and under any regulations as to the custody and use thereof as he may prescribe, a uniform stencil brand bearing a suitable device or motto and the words "Washington State Full Cream Cheese." Every brand issued shall be used on the outside of the cheese, and shall have a different number for each separate manufactory, and the commissioner shall keep a book in which shall be registered the name, location, and number of each manufactory using the said brand, and the name or names of the persons at each manufactory authorized to use the same. It shall be unlawful to use or permit such stencil brand to be used upon any other than full-cream cheese or packages containing the same, and such

**Cheese standard.** cheese only as shall contain thirty per centum of pure butter fat and have been manufactured from pure and wholesome milk, from which no portion of the butter fat shall have been removed by skimming or by other process, and in the manufacture of which neither butter nor any substance for butter, or any animal or vegetable fats or oils, have been used, or any fat which has been extracted from milk in any form and returned for the purpose

**Skimmed cheese to be marked.** of filling said cheese, shall be stamped with the "State brand." All cheese containing less than thirty per centum of pure butter fat shall be marked "skimmed cheese" in full-face capital letters not less than one inch high, with such ink as is not easily removed by

**Filled cheese prohibited, fancy cheese permitted.** moisture. The manufacture or sale of any cheese containing less than fifteen per centum of pure butter fat, or so-called "filled cheese," is hereby prohibited. *Provided*, That nothing in this section shall be construed to apply to



Edam, Brickstein, Pineapple, Limburger, Swiss, or hand-made cheese, or any other fancy cheese: *Provided further*, That cheese not made in this State, but which shall be sold or offered for sale in this State, shall be so stamped as to indicate its true character: *And provided further*, That no cheese shall be stamped "full cream" which does not in every particular comply with the requirements of "Washington full cream" cheese, as hereinbefore set forth, except as to place of manufacture.

**SEC. 4.** The dairy commissioner shall furnish Annual reports from dairy concerns. blanks to all proprietors or managers of creameries, cheese factories, or milk dairies that ship milk and all the vendors and peddlers of milk within the State, for the purpose of making a report of the amount of milk and dairy goods handled, and all owners or managers of such creameries and cheese factories, and all milk dairies, milk vendors, or milk peddlers shall fill out the blank, giving a full and accurate report of the business done during the year, and send it to the dairy commissioner before the first day of November of each year: every person or corporation who shall engage in the business of purchasing or dealing in milk shall attach in a permanent manner to each can furnished by him or it to the producer a tag containing in plain figures a correct statement of the capacity thereof. Any neglect or failure or false statement on the part of any proprietor or manager of such creamery, cheese factory, dairy, or milk vendor or milk peddler, shall be considered a misdemeanor, and upon conviction thereof shall be punished by a fine as provided in section 13: *Provided*, That any information thus furnished shall be published only in such form as to show totals and averages, and not the details of the business of any individual or concern.

**SEC. 5.** No person, by himself, his agents, or his servants, shall render or manufacture, sell, offer for sale, expose for sale, or have in his possession with intent to sell or serve for patrons, guests, boarders, or inmates of any hotel, eating house, restaurant, public conveyance, or boarding house or public or private hospital, asylum, school, or eleemosynary or penal institution, any article, product, or compound made wholly or partly out of any fat, oil, or oleaginous substance or compound thereof, not produced directly and wholly at the time of manufacture from unadulterated milk or the cream from the same, with or without harmless coloring matter, which shall be in imitation of yellow butter produced from pure, unadulterated milk or the cream from the same: *Provided*, That nothing in this act shall be construed to prohibit the manufacture and sale of oleomargarine in a separate and distinct form, and in such manner as will advise the consumer of its real character, free from coloration or ingredient that causes it to resemble butter, or the use of the same by patrons, guests, boarders, or inmates of any hotel, eating house, restaurant, public conveyance, or boarding house, when signs are displayed in a conspicuous place that may be easily read from any part of the room.

**SEC. 6.** It shall be unlawful for any person to sell or offer for sale or exchange, or have in his possession for sale, any cheese containing any substance except salt, rennet, and harmless coloring matter, other than that produced from pure milk or cream, or both, or from pure skimmed or pure half-skimmed milk.

**SEC. 7.** There shall be appointed by the governor, by and with the consent and advice of the senate, one competent person who shall be denominated the dairy commissioner, whose term of office shall continue four years from and after the first Monday in April after his appointment, subject to removal for cause by the governor, or until his successor be appointed and qualified.

**SEC. 8.** Before entering upon his duties said dairy commissioner shall file with the secretary of State a good and sufficient bond in the sum of five thousand dollars (\$5,000) conditioned for the faithful discharge of his duties under this act.

**SEC. 9.** Said dairy commissioner may appoint one or more deputies whenever he is unable to perform all the duties of his office without assistance. They shall hold office at the pleasure of the dairy commissioner who may summarily remove any such deputy whenever in his judgment the public service calls for such removal: *Provided*, No deputy shall be employed at the cost of the State for more than thirty days in any one year: *Provided*, That not more than six deputies be appointed.



**Duty of dairy commissioner.** SEC. 10. It shall be the duty of the dairy commissioner to devote his entire time and attention to the dairy interests of the State of Washington, to enforce all laws that now exist or that may be hereafter enacted in this State regarding the production, manufacture, or sale of dairy produce, and personally to inspect any articles of milk, butter, cheese, or imitations thereof, made or offered for sale within the State, which he may suspect or have reason to believe to be impure, unhealthful, adulterated, or counterfeit; and to prosecute or cause to be prosecuted any person or persons, firm or firms, corporation or corporations engaged in the manufacture or sale of any adulterated or counterfeit dairy products contrary to law.

**Duty of chemists in State institutions.** SEC. 11. It shall be the duty of the chemist of any State institution to correctly analyze, without extra compensation, and without other charge to the State than necessary traveling expenses, any and all substances that the dairy commissioner may send to any of them and to report to him without unnecessary delay the result of any analysis so made, and when called upon by said dairy commissioner any such chemist shall assist him in prosecuting violators of the law, by giving testimony, either expert or otherwise.

**Powers of dairy commissioner or deputies.** SEC. 12. The dairy commissioner or his deputies shall have power, in the performance of their official duties, to enter any creamery, cheese or condensed milk factory, store, salesroom, warehouse, or any place or building where he has reason to believe that any dairy products or imitations of dairy products are kept, made, prepared, sold, or offered for sale or exchange; and to open any cask, tub, package, or receptacle of any kind, containing or supposed to contain any such article, and to examine, or cause to be examined and analyzed, the contents thereof; he may seize or take any such article for analysis: *Provided*, That if the person from whom such sample is taken shall request him to do so, he shall at the same time and in the presence of the person from whom such property was taken, seal up two samples of the article seized or taken, one of which shall be for examination or analysis under the direction of said commissioner, and the other of which shall be delivered to the person from whom the article is taken.

**Penalty.** SEC. 13. Any person who shall violate any of the provisions of this act, or who shall obstruct the dairy commissioner in the performance of his duties under this act by refusing him entrance to any place enumerated in the preceding section, or by refusing to deliver to him any dairy products or imitations thereof upon demand, shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be punished by a fine of not less than twenty-five dollars (\$25), nor more than one hundred dollars (\$100), or by imprisonment for not less than one month or more than six (6) months, or by both such fine and imprisonment.

**Compensation and expenses of dairy commissioner.** SEC. 14. The dairy commissioner shall receive an annual salary of twelve hundred dollars (\$1,200) and his necessary expenses in the discharge of his duties under this act: *Provided*, That such expenses shall not exceed one thousand dollars (\$1,000).

**Legal assistance.** SEC. 15. It shall be the duty of the attorney general or the prosecuting attorney in any county of the State, when called upon by the dairy commissioner, to render any legal assistance in their power to execute the laws and to prosecute cases arising under the provisions of this act: *Provided*, That the dairy commissioner may employ special counsel when necessary.

**State board ex-officio.** SEC. 16. The secretary of State, the professor of agriculture of the agricultural college and the dairy commissioner are hereby created a State board of dairy commissioners *ex-officio*.

**Traveling expenses allowed.** SEC. 17. The State board of dairy commissioners shall receive no compensation for their services as such board, but shall be allowed necessary traveling expenses. All accounts for expenditure incurred or made pursuant to the provisions of this act shall be approved and certified by said State board of dairy commissioners before presentation to the state auditor.

**Biennial reports.** SEC. 18. The State board of dairy commissioners shall biennially, on December first, report to the governor of this State a full account of their actions under this act; also the operations and results of this and any other laws pertaining to the dairy industry of the State; a full account of all expenses and disbursements of the board; as full and complete statistics as it is in

their power to collect pertaining to the manufacture, imports and exports of dairy products within the State for the biennial term; and shall make suggestions as to the need of further legislation on this subject.

**Expenses.** SEC. 19. All expenses incurred under the provisions of this act shall be audited by the State auditor upon bills being presented, properly certified by the board of dairy commissioners, and the said auditor shall, from time to time, draw warrants upon the State treasurer for the amounts thus audited.

**Appropriation.** SEC. 20. To carry out the provisions of this act, there is hereby appropriated out of the general fund of the State for the term beginning April 1, 1899, six thousand dollars (\$6,000).

**Disposition of fines.** SEC. 21. One-half of all fines collected under the provisions of this act shall be paid to the State treasurer and placed to the credit of the general fund and the remainder to be paid forthwith into the treasury of the county in which the conviction is obtained.

**Assistance from railroads, etc.** SEC. 22. All clerks, bookkeepers, express agents, railroad officials, employes, or employes of common carriers shall render to the dairy commissioner and his deputies all the assistance in their power in tracing, finding, or discovering the presence of any article named in this act. Any refusal or neglect on the part of such clerks, bookkeepers, express agents, railroad officials, employes, or employes of common carriers to render such friendly aid, shall be a misdemeanor, punishable by fine of not less

**Penalty.** than twenty-five (\$25) nor more than one hundred dollars (\$100), or by imprisonment for not less than one month or more than six months, or by both such fine and imprisonment for each and every offense.

**Cream standard.** SEC. 23. No person shall sell or offer for sale any cream taken from impure or diseased milk, or any cream that contains less than eighteen per centum of pure butter fat. Any person violating the provisions of this

**Penalty.** section shall be deemed guilty of a misdemeanor and upon conviction thereof shall be punished by a fine of not less than twenty-five dollars (\$25) nor more than one hundred dollars (\$100), or by imprisonment for not less than one (1) month nor more than six (6) months, or by both such fine and imprisonment.

**License to peddle milk.** SEC. 24. Every person who conveys milk in carriages, carts, or other vehicle for the purpose of selling the same in any city or town in the State of Washington, shall annually on the first day of June, or within thirty (30) days thereafter, procure from the State dairy commissioner a license to sell milk within the limits of said city or town, and shall pay to the said dairy commissioner the sum of one dollar (\$1) for each carriage, cart, or other vehicle to be used as provided for in section 20. Licenses shall be issued only in the names of the owners of carriages, carts, and other vehicles and shall, for the purpose of this act, be conclusive evidence of ownership. No license shall be sold, assigned, or transferred; each license shall contain the name, residence, place of business, number of carriages, carts, or other vehicles used, and the number of the

**Vehicles to bear signs.** license. Each licensee shall, before engaging in the sale of milk, cause his name, the number of the license, and his place of business to be legibly placed on each outside of all carriages, carts, or other vehicles used by him in the conveyance or sale of milk. Whoever, without being first licensed under the provisions of this section, sells milk or exposes it for sale from carriages, carts, or other vehicles, or has the same in his custody or possession with intent to sell, shall be deemed guilty of a misdemeanor, and upon con-

**Penalty.** viction thereof shall be punished by a fine of not less than twenty-five dollars (\$25) for each offense, nor more than one hundred dollars (\$100), or by imprisonment for not less than one month or more than six months or by both such fine and imprisonment: *Provided*, That nothing in this section shall apply to persons handling or using the milk from not more than two cows.

**Milk license for stores, etc.** SEC. 25. Every person before selling milk or offering it for sale in a store, booth, stand, or market place in any town or city, shall procure a license from the State dairy commissioner and shall pay to said commissioner the sum of one dollar (\$1) yearly, within thirty days after June 1. Any person who neglects to procure such license shall be deemed

**Penalty.** guilty of a misdemeanor and upon conviction shall be punished for each offense by a fine of not less than twenty five dollars (\$25) nor more than one hundred dollars (\$100) for each and every offense or by imprisonment for not

less than one month or more than six months or by both such fine and imprisonment.

**Skimmed milk to be marked.** SEC. 26. No person shall sell or expose for sale in any store or place of business or in any wagon or other vehicle used in the transportation or sale of milk from which cream has been removed or milk commonly called "skimmed milk" without first marking the can or package containing said milk with the words "skimmed milk" in large plain black letters, each letter being at least one inch high and one-half inch wide, said words to be on the side not below the middle of said can or package, where they can be easily seen. Any person violating the provisions of this section shall be deemed guilty of a misdemeanor, and upon conviction shall be punished by a fine of not less than twenty-five dollars (\$25) nor more than one hundred dollars (\$100) for each and every offense, or by imprisonment for not less than one month or more than six months or by both such fine and imprisonment.

**Moneys received by commissioner.** SEC. 27. That all moneys received for licenses or from the sale of any and all goods confiscated by the dairy commissioner under this act shall be received by said commissioner and deposited the first of every month with the State treasurer, to be placed in the general fund.

**Evidence.** SEC. 28. Possession by any person or firm of an article or substance the sale of which is prohibited by this act shall be considered *prima facie* evidence that the same is kept by such person or firm in violation of the provisions of this act, and the commissioner shall be authorized to seize upon and take possession of such articles or substances, and upon the order of any court which has jurisdiction thereof, he shall sell the same for any purpose other than to be used for food, the proceeds to be paid to the State treasurer and placed to the credit of the general fund.

**State brand for creamery butter.** SEC. 29. The State dairy commissioner is hereby authorized and directed to procure and issue to the manufacturers of creamery butter of the State and under such regulations as to the custody and use thereof as he may prescribe a uniform brand bearing a suitable device or motto, and the words "Washington Creamery Butter." Every brand issued shall be used on the wrapper of each package and also on the outside of every package used by him, and shall contain a different number for each separate manufactory, and the commissioner shall keep a book in which shall be registered the name, location, and number of each manufacturer using the said brand. It shall be unlawful to use or permit such brand to be used upon any other than Washington creamery butter or packages containing the same. Any person violating the provisions of this section shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be fined for each offense not less than twenty-five dollars (\$25) nor more than one hundred dollars (\$100) or by imprisonment for not less than one month or more than six months, or by both such fine and imprisonment.

**Penalty.** SEC. 30. No person, firm, or corporation shall manufacture, sell, or offer for sale or have in his possession with intent to sell butter known as process butter, unless the package in which the butter is sold has marked on the side of it the words "renovated butter" in capital letters one inch high and one-half inch wide with ink which is not easily removed. *Provided*, That it shall be unlawful for any retailer to sell said butter and unless a card is displayed on the package from which he is selling butter with the following words printed thereon so that it may be easily read by the purchaser "renovated butter," or if it is sold in packages on which a wrapper is used the words "renovated butter" shall be plainly printed on each and every wrapper.

**Card displayed on package.** *Provided further*, That all process butter shipped from other states shall be subject to the same regulations as provided in this section. Whoever violates the provisions of this section shall be deemed guilty of a misdemeanor, and upon conviction shall be fined for each and every offense not less than twenty-five dollars (\$25) nor more than one hundred dollars (\$100) or by imprisonment for not less than one month or more than six months, or by both such fine and imprisonment.

**Wrapper marked.** SEC. 31. All acts and parts of acts in conflict with the provisions of this act are hereby repealed.

**Repeal.** SEC. 32. An emergency exists, and this act shall take effect immediately.

**In effect.**



AN ACT to provide against the adulteration of food. (Approved March 13, 1899.)

**Adulterated food prohibited.** SECTION 1. No person shall, within this State, manufacture for sale, offer for sale, or sell any article of food which is adulterated within the meaning of this act.

**Food defined.** SEC. 2. The term "food," as used herein shall include all articles used for food or drink by man, whether simple, mixed, or compound.

**Adulterated defined.** SEC. 3. Any article shall be deemed to be adulterated within the meaning of this act: In the case of food—(1) If any substance or substances have been mixed with it, so as to lower or depreciate, or injuriously affect its quality, strength, or purity. (2) If any inferior or cheaper substance or substances have been substituted wholly or in part for it. (3) If any valuable or necessary constituent or ingredient has been wholly or in part abstracted from it. (4) If it is an imitation of, or is sold under the name of, another article. (5) If it consists wholly or in part, of a diseased, decomposed, putrid, infected, tainted, or rotten animal, or vegetable or fruit substance or article, whether manufactured or not; or in the case of milk, if it is the produce of a diseased animal. (6) If it is colored, coated, polished, or powdered, whereby damage or inferiority is concealed, or if by any means it is made to appear better or of greater value than it really is. (7) If it contains any added substance or ingredient which is poisonous or injurious to health: *Provided*, That the provisions of this act shall not apply to mixtures or compounds recognized as ordinary articles or ingredients of articles of food, if each and every package sold or offered for sale be distinctly labeled as mixtures or compounds, with the name and per cent of each ingredient therein and are not injurious to health.

**Samples for analysis.** SEC. 4. Every person manufacturing, exposing, or offering for sale, or delivering to a purchaser, any article of food included in the provisions of this act, shall furnish to any person interested or demanding the same, who shall apply to him for the purpose, and shall tender him the value of the same, a sample sufficient for the analysis of any such article of food which is in his possession.

**Penalties.** SEC. 5. Whoever refuses to comply, upon demand with any of the requirements of section 4, and whoever violates any of the provisions of this act, shall be guilty of a misdemeanor, and upon conviction shall be fined not exceeding one hundred nor less than fifty dollars, or imprisoned not exceeding ninety or less than thirty days, or both; any person found guilty of manufacturing, offering for sale, or selling any adulterated articles of food under the provisions of this act, shall be adjudged to pay, in addition to the penalties herein provided for, all necessary costs and expenses incurred in inspecting and analyzing such adulterated articles of which said person may have been found guilty of manufacturing, selling, or offering for sale: *Provided*, That all penalties and costs for the violation of the provisions of this act shall be paid to the State dairy and food commission, or their agent, and by them paid into the State treasury, to be paid as a fund separate and apart for the use of the State dairy and food commissioner for the enforcement of this act, and called "pure food fund."

**Dairy and food commissioner; additional salary.** SEC. 6. The State dairy commissioner shall be State dairy and food commissioner, and shall receive, in addition to his salary as dairy commissioner, \$300 per year, as extra compensation for enforcing the provisions of this act, and his necessary expense, out of the pure food fund in the discharge of his duties under this act.

**Appropriation.** SEC. 7. There shall be appropriated for salary of State dairy and food commissioner \$600, for two years ending April 1st, 1901, and \$1,000 out of the food commission fund for expenses of said commissioner.

**Chemists in State institutions to assist.** SEC. 8. It shall be the duty of the chemist of any State institution to correctly analyze, without extra compensation, and without extra charge to the State other than necessary expenses, any and all substances that the dairy [and] food commissioner may send to them, and to report to him without [un]necessary delay, the result of any analysis so made, and when called upon by said commissioner, any such chemist shall assist him in prosecuting violations of the law by giving testimony, either expert or otherwise.



**Legal assistance.** SEC. 9. It shall be the duty of the attorney general, or the prosecuting attorney in any county in the State, when called upon by the dairy commissioner to render any legal assistance in their power to execute the laws and to prosecute cases arising under the provisions of this act: *Provided*, That the dairy commissioner may employ special counsel if necessary.

**State board of dairy and food commission.** SEC. 10. The State board of dairy commissioners, *ex officio*, shall be "the State board of dairy and food commission." All expenses incurred under the provisions of this act shall be paid out of the "pure food fund," and shall be audited by the State auditor upon bills being presented, properly certified by the board of dairy and food commission, and the State auditor shall from time to time draw warrants upon the State treasurer for the amounts thus audited.

This act shall take effect April 1, 1899.

## WEST VIRGINIA.

See Fourteenth Annual Report of the Bureau of Animal Industry, page 697, for—

Code of 1891, chapter 150, sections 20 and 20a.—Concerning adulterated food and imitation butter and cheese.

Acts of 1891, chapter 8 (sections 1-3).—An act in relation to manufacture and sale of oleomargarine, artificial or adulterated butter. (Approved February 16, 1891.)

## WISCONSIN.<sup>1</sup>

[The laws of Wisconsin were published on pages 697-703 of the Fourteenth Annual Report of the Bureau of Animal Industry, but have since been issued in different form, as below.]

**Dairy commissioner; term, etc.** 1. [Section 1410, Statutes of 1898.] The dairy and food commissioner shall be appointed by the governor, by and with the advice and consent of the senate, for a term of two years from the date of his appointment and until his successor qualifies. Vacancies occurring from any cause shall be filled for the remainder of the term by the governor, with the advice and consent of the senate if it shall be in session, or if it is not in session, subject to approval at the session next held after such appointment is made, if the term for which it was made has not expired.

**Assistant, chemist, agent, and clerk.** Such commissioner may, with the advice and consent of the governor, appoint an assistant, who shall be an expert in dairy products, and a chemist who shall be a practical analytical chemist; he may also, with such advice and consent, appoint an agent for the inspection of milk dairies, factories, and creameries, and to assist in the work of the dairy and food commission at such times and for such periods of time as may be required in the enforcement of the dairy and food laws. The compensation of such agent shall be three dollars per day for each day of actual service, and his expenses, to be audited by the secretary of State on the presentation of accounts approved by the dairy and food commissioner. Said commissioner may also appoint a stenographer and confidential clerk. The commissioner shall be furnished with a suitable office in the capitol, and with such supplies and printing as may be necessary. He shall as soon as practicable after the thirtieth day of September in each even-numbered year make a report to the governor and give therein an itemized statement of all expenses incurred by him, and of all fines collected, with such statistics and other information and suggestions as he may regard of value.

**Powers and duties.** 2. [Section 1410a, Statutes of 1898.] It shall be the duty of the commissioner to enforce the laws regarding the production, manufacture, and sale of dairy products, the adulteration of any article of food or drink or of any drug, and personally or by his assistants to inspect any milk, butter, cheese, lard, syrup, coffee, tea, or other article of food or drink or drug made or offered for sale within this State which he may suspect or have reason to believe to be impure, unhealthful, adulterated, or counterfeit, and to prosecute or cause to be prosecuted any person, firm, or corporation engaged in the manufacture or sale of any adulterated or counterfeit article or articles of food or drink or drug in violation of law. The district attorney of the county in which a violation of any such law has occurred shall, when called upon

<sup>1</sup> Arranged as in "Laws of Wisconsin, relating to the office and duties of the dairy and food commissioner, and the adulteration of butter, cheese, milk, and other foods, drugs, and medicines, with rulings thereon," published in 1899 by the dairy and food commissioner.

by the commissioner or either of his assistants to do so, give all the aid he can to secure the execution of the law and shall prosecute cases arising under the provisions of this chapter or other provisions of these statutes relating to the adulteration of food, drinks, and drugs and their sale. Such commissioner shall have power to appoint, with the approval of the governor, special counsel to prosecute or assist in the prosecution of any case arising under the provisions of these statutes imposing a penalty for adulterating dairy products or practicing deception in fraud in the manufacture and sale thereof. All fines collected in prosecutions begun or caused to be begun by the dairy and food commissioner or either of his assistants shall be paid into the State treasury.

**Authority for inspections.** 3. [Section 1410*b*, Statutes of 1898.] The commissioner, his agent or assistant shall have free access to any barn or stable where any cow is kept or milked, or to any factory, building, dairy, or premises where any dairy product is manufactured, handled, or stored, when the milk from such cow or such product is to be sold or shipped, and may enforce such measures as are necessary to secure perfect cleanliness in and around the same and of any utensil used therein, and to prevent the sale of milk from cows diseased or fed upon unwholesome food. Either of them may enter any place or building in which there is reason to believe that any food, drink, or drug is made, prepared, sold, or offered for sale, and may open any package or receptacle of any kind containing, or which is supposed to contain, any article of food, drink, or drug, and examine or analyze the contents thereof. Any such article or sample thereof may be seized or taken for the purpose of having it analyzed; but if the person from whom it is taken shall so request, at the time of taking, the officer shall then and in the presence of such person securely seal up two samples of such article, one of which shall be for analysis under the direction of the commissioner, the other shall be delivered to the person from whom the sample or article was obtained. Said commissioner shall adopt a uniform stencil, bearing a suitable device or motto, a number and the words "Wisconsin full-cream cheese" and a space for a number, and upon proper application therefor and under such regulations as to the custody and use thereof as he may prescribe, issue the same, with the proper number inserted, to the proprietor or manager of any cheese factory in this State; he shall enter in a book kept for that purpose the name, location and number of each factory using such stencil, no number being duplicated, and the name of the person thereat authorized to use the same.

**Analyses.** 4. [Section 1410*c*, Statutes of 1898.] The State board of health, medical officers of local boards of health, town and village boards or common councils may submit to the dairy and food commissioner samples of water or other drinks, of food or drugs for analysis, and the same shall be examined and reports made of the analysis thereof to the body or officer submitting the same as soon as practicable; such reports shall fully specify the results of the analysis and be signed by such commissioner; they shall be accepted in all courts and places as prima facie evidence of the properties or condition of the articles analyzed.

**Farmers' institutes.** 5. [Section 1410*d*, Statutes of 1898.] The governor may authorize the commissioner or his assistants, when not engaged in the performance of other official duties, to give such aid in farmers' institutes, dairy and farmers' conventions and the agricultural department of the State university as may be deemed advisable. For the necessary expenses of making the analyses contemplated in the foregoing sections the commissioner may incur an annual expense of not to exceed six hundred dollars, the accounts for which, when verified and itemized and approved by the governor shall be audited by the secretary of State.

**Persons obstructing; penalty.** 6. [Section 4607*h*, Statutes of 1898.] Any person who shall obstruct the dairy and food commissioner of this State or either of his assistants in the performance of their duty by refusing him entrance to any place he is authorized to enter or by refusing to deliver to him a sample of any article of food, drink, or drug made, sold, offered or exposed for sale by the person to whom request therefor is made, if the value thereof is tendered, shall be punished for the first offense by fine not exceeding twenty-five dollars, and for each subsequent offense by fine not exceeding five hundred dollars nor less than fifty dollars.

**Adulterated milk.** 7. [Section 4607, Statutes of 1898]. Any person who shall sell or offer for sale, furnish, or deliver, or have in possession with intent to sell or offer for sale or furnish or deliver to any creamery, cheese factory, cor-

**Penalty.** poration, or person as pure, wholesome and unskinned any unmerchantable, adulterated, impure, or unwholesome milk shall be punished by a fine of not less than twenty-five dollars nor more than one hundred dollars.

**Milk standard.** 8. [Section 4607a, Statutes of 1898.] In all prosecutions under the preceding section or any other section of these statutes for the sale of unmerchantable, adulterated, impure, or unwholesome milk any milk which shall be proven to contain less than three per centum of pure butter fat, when subjected to chemical analysis or other satisfactory test, or that has been diluted, or any part of the cream of which has been abstracted, or that, or any part of it, was drawn from a cow known to the defendant to have been at the time it was drawn within fifteen days before or less than four days after parturition, or which was so known to have any disease, ulcers or other running sores, then and in either such case the milk sold or offered for sale, furnished, or delivered or had in possession with intent to sell it, offer it for sale or furnish or deliver it as pure, wholesome, and unskinned shall be held or found to be unmerchantable, adulterated, impure, or unwholesome, as the fact may be. Proof of adulteration or skimming may be made with such standard tests and lactometers as are used to determine the quality of milk or by chemical analysis.

**Diseased cows; unsanitary conditions; slops.** 9. [Section 1, chapter 313, laws of 1899.] No person by himself or agent shall offer for sale, furnish, or deliver, or have in possession with the intent to sell, or offer for sale, or furnish or deliver, milk or cream drawn from sick or diseased cow or cows kept in filthy and unsanitary condition, or cows fed on refuse or slops from distilleries or vinegar factories, unless such refuse or slop be mixed with other dry sanitary grain or food to a consistency of a thick mush.

**Foreign substances in milk.** 10. [Section 2, chapter 313, laws of 1899.] No person by himself or agent shall offer for sale or furnish or deliver or have in possession with the intent to sell, offer for sale, or furnish or deliver, any milk or cream having therein or containing in any amount any foreign substance or coloring matter or any chemical or preservative, whether for the purpose of increasing the quantity of milk or cream or for improving its appearance, or for preserving the condition of sweetness thereof, or for any purpose whatever, provided that nothing in this act shall be construed to prohibit the sale of pasteurized milk or cream, to which viscogen or sucrate of lime has been added solely for the purpose of restoring the viscosity, if the same be distinctly labeled in such manner as to advise the purchaser of its true character.

**Penalty.** 11. [Section 3, chapter 313, laws of 1899.] Any person violating any of the provisions of this act shall, upon conviction, be fined not less than twenty-five nor more than one hundred dollars for each and every offense.

**Imitation cheese prohibited.** 12. [Section 4607c, Statutes of 1898.] Any person who shall, by himself, his agent or servant, manufacture, buy, sell, offer, ship, consign, expose, or have in possession for sale any cheese manufactured from or by the use of skim milk to which there has been added any fat which is foreign to such milk, or who shall by himself, his agent or servant, manufacture, buy, sell, offer, ship, consign, expose, or have in possession for sale,

**Skim cheese size regulated.** within this State, any skimmed-milk cheese, or cheese manufactured from milk from which any of the fat originally contained therein has been removed, except such last mentioned cheese is ten inches in diameter and nine inches in height, or who shall, by himself, his agent

**Imitation butter prohibited.** or servant, render or manufacture, sell, ship, consign, offer, or expose for sale or have in possession with intent to sell, any article, product, or compound made wholly or partly out of any fat, oil, or oleaginous substance or compound thereof, not produced from unadulterated milk or cream from the same, and without the admixture or addition of any fat foreign to said milk or cream, which shall be in imitation of yellow butter produced from such milk or cream, with or without coloring matter, shall,

**Penalty.** for the first offense, be punished by fine of not more than five hundred dollars nor less than fifty dollars, and for each subsequent offense by imprisonment in the county jail not to exceed sixty days nor less than ten days, or by fine of not more than five hundred dollars nor less than one hundred dollars, or by

**Oleomargarine permitted.** both such fine and imprisonment. Nothing in this section shall be construed to prohibit the manufacture or sale of oleomargarine in a separate and distinct form and in such manner as will advise the consumer of its real character, and free from coloration or ingredient that causes it to look like butter.



**Notice of sale or use of imitation butter.** 13. [Section 4607*d*, Statutes of 1898.] Any person who shall sell or offer for sale to any person butter, any oleomargarine, butterine, or any similar substance made in imitation or semblance of pure butter, not made entirely from the milk of cows, with or without coloring matter, or who shall expose for sale oleomargarine, butterine, or any similar substance not marked and distinguished on the outside of each tub, package, or parcel thereof by a placard with the word "oleomargarine," and not having also upon every open tub, package, or parcel thereof a placard with the word "oleomargarine," such placard in each case to be printed in plain, uncondensed Gothic letters not less than one inch long, and not containing any other words thereon, or who shall sell oleomargarine, butterine, or any similar substance from any dwelling, store, office, or public mart, without having conspicuously posted thereon the placard or sign, in letters not less than four inches in length, "oleomargarine sold here" or "butterine sold here," which placard or sign shall be approved by the dairy and food commissioner of this State, or who shall sell or deliver from any cart, wagon or other vehicle, upon the public streets or ways, oleomargarine, butterine, or any similar substance, without having on the outside of both sides of said cart, wagon, or other vehicle a placard, in uncondensed Gothic letters not less than three inches in length, "licensed to sell oleomargarine," or who shall furnish or cause to be furnished in any hotel, boarding-house, restaurant, or at any lunch counter, oleomargarine, butterine, or any similar substance to any guest or patron thereof, without first notifying such guest or patron that the substance so furnished is not butter, shall be punished as provided in the last preceding section.

**Imitation butter and cheese in State institutions prohibited.** 14. [Section 4607*e*, Statutes of 1898.] Any person who shall knowingly or negligently buy or procure for use as food in any of the charitable, correctional, or penal institutions of this State any butter or cheese not made wholly and directly from pure milk or cream, salt, and harmless coloring matter, shall be fined not exceeding fifty dollars nor less than twenty-five dollars for the first offense. **Penalty.** and for each subsequent offense shall be punished by imprisonment in the county jail not more than ninety days nor less than ten days, or by fine not exceeding one hundred dollars nor less than fifty dollars, or by both fine and imprisonment.

**Renovated butter to be marked.** 15. [Section 1, chapter 76, laws of 1899.] No person by himself or agent shall sell, exchange, or deliver, or expose for sale or offer for sale renovated butter, or butter which has been melted and its rancidity removed or masked, and which has been regranulated, colored, and prepared in imitation or in semblance of genuine creamery butter, unless the substance be marked distinctly on the outside of each and every package or parcel thereof by a label printed with the words "Renovated Butter," and without having on each and every open tub, package, or parcel thereof a placard with the words "Renovated Butter," such placard or brand in each case to be printed in plain, uncondensed Gothic capitals not less than one inch long, and such placard shall contain no other words thereon.

**Penalty.** 16. [Section 2, chapter 76, laws of 1899.] Any person who shall violate any of the provisions of this act [the preceding paragraph] shall be guilty of a misdemeanor, and upon conviction thereof be fined not less than twenty-five nor more than one hundred dollars.

**Cheese falsely labeled.** 17. [Section 4438*g*, Statutes of 1898.] Any person who shall sell, offer for sale, ship, or consign cheese labeled with a false brand or label as to the quality of the article, or shall use any stencil or label furnished by the dairy and food commissioner of this State and bearing the words "Wisconsin full-cream cheese," otherwise than upon the bandage on the side of full-cream cheese and upon the package containing the same, shall be punished by fine of not more than fifty dollars nor less than twenty-five dollars.

**Cleanliness of dairy cows and utensils.** 18. [Section 4607*j*, Statutes of 1898.] Any person owning or managing a dairy, the product of which is sold for family use, who shall feed his cows upon unwholesome food or keep them in unclean stables or handle the milk with unclean utensils shall be deemed guilty of a misdemeanor and upon conviction thereof be fined not less than twenty-five dollars nor more than one hundred dollars for the first offense, and **Penalty.** not less than one hundred dollars nor more than two hundred dollars for each subsequent offense.



**Wrongful use of milk.** 19. [Section 1494a, Statutes of 1898.] Any butter or cheese manufacturer who shall knowingly use or allow any other person to use for the benefit of himself or any other person than he who is entitled to the benefit thereof any milk or cream from the milk brought to him, without the consent of the owner thereof, or who shall refuse or neglect to keep or cause to be kept a correct account (which shall be open to the inspection of any person furnishing milk to him) of the amount of milk daily received, or of the number of pounds of butter, and the number and aggregate weight of cheese made by him each day, or of the number of cheese cut or otherwise disposed of and the weight of each, shall for each and every offense forfeit not less than twenty-five nor more than one hundred dollars, one-half of which shall be paid to the person upon whom any such fraud has been committed and who first made complaint thereof; the remainder shall be paid to the school fund.

**Unwholesome provisions.** 20. [Section 4599, Statutes of 1898.] Any person who shall knowingly sell any kind of diseased, corrupted, or unwholesome provisions, whether for meat or drink, without making the same fully known to the buyer, shall be punished by imprisonment in the county jail not more than six months or by fine not exceeding one hundred dollars.

**Sale of adulterated food prohibited.** 21. [Section 4600, Statutes of 1898.] Any person who shall, by himself, his servant, or agent or as the servant or agent of any other person, sell, exchange, deliver, or have in his possession with intent to sell, exchange, offer for sale, or exchange any drug or article of food which is adulterated, shall be fined not less than twenty-five dollars nor more than one hundred dollars or be imprisoned in the county jail not less than thirty days nor more than four months. The term "drug," as used in this section, shall include all medicines for internal or external use, antiseptics, disinfectants, and co-metics. The term "food," as used herein, shall include all articles used for food or drink by man, whether simple, mixed, or compound.

22. [Section 4601, Statutes of 1898.] An article shall be deemed to be adulterated within the meaning of the preceding section:

1. In the case of drugs: \* \* \*

2. In the case of food: First, if any substance or substances have been mixed with it, so as to lower or depreciate or injuriously affect its strength, quality, or purity; second, if any inferior or cheaper substance or substances have been substituted wholly or in part for it; third, if any valuable or necessary ingredient has been wholly or in part abstracted from it; fourth, if it is an imitation of or sold under the name of another article; fifth, if it consists, wholly or in part, of a diseased, infected, decomposed, putrid, tainted, or rotten animal or vegetable substance or article, whether manufactured or not; sixth, if it is colored, coated, polished, or powdered, whereby damage or inferiority is concealed, or if by any means it is made to appear better or of greater value than it really is; seventh, if it contains any added substance or ingredient which is poisonous, injurious, or deleterious to health, or any deleterious substance not a necessary ingredient in its manufacture: *Provided*, That the provisions of this or the preceding section shall not apply to mixtures or compounds recognized as ordinary articles of food if the same be distinctly labeled as mixtures or compounds and from which no necessary ingredient in their preparation is eliminated.

## WYOMING.

REVISED STATUTES, 1899.<sup>1</sup>

**Milk may be sold Sundays.** SEC. 2644. It shall be unlawful for any person or persons, company, or corporation to keep open any barber shop, store, shop, or other place of business for the transaction of business therein upon the first day of the week, commonly called Sunday: *Provided*, This section shall not apply to \* \* \* vendors of ice, milk, fresh meat, and bread, except as to the sale of liquors and cigars. Any person, company, or corporation who shall violate the provisions of this section, shall, on conviction thereof, be fined in a sum of money not less than twenty-five dollars, nor more than one hundred dollars, for each offense.

**Adulterating foods; penalty.** SEC. 5103. Every person who adulterates or dilutes any article of food, drink, drug, medicine, spirituous or

<sup>1</sup> Sec. 2644=S. L. 1888, chapter 86, section 2. 5109 and 5110=R. S. 1887, sections 1007 and 1008.

malt liquor, or wine, or any article used in compounding them, with a fraudulent intent to offer the same for sale, or to cause or permit the same to be offered for sale, as unadulterated and undiluted; and every person who fraudulently sells or keeps or offers for sale the same as unadulterated or undiluted shall be punished by a fine of not more than five hundred dollars, or imprisonment in the county jail not more than sixty days, or by both.

**Sale of unwholesome foods; penalty.** SEC. 5110. Every person who knowingly sells or keeps, or offers for sale, or otherwise disposes of, or tries to dispose of, any article of food, drink, drug, or medicine, knowing that the same has become tainted, decayed, spoiled, or otherwise unwholesome or unfit to be eaten or drunk shall be fined not more than fifty dollars, or imprisoned in the county jail not more than thirty days, or both.

#### CANADA.

See Fourteenth Annual Report of the Bureau of Animal Industry, pages 703-708, for—

49 Victoria, chapter 42 (section 1).—An act to prohibit the manufacture and sale of certain substitutes for butter. (Assented to 2d June, 1886.)

52 Victoria, chapter 43 (sections 1-11).—An act to provide against frauds in the supplying of milk to cheese, butter and condensed milk manufactories. (Assented to 2d May, 1889.)

— Victoria, chapter — (sections 1-11).—An act to prevent the manufacture and sale of filled or imitation cheese, and to provide for the branding of dairy products.

60 and 61 Victoria, chapter 21 (sections 1-9).—An act to provide for the registration of cheese factories and creameries, and the branding of dairy products, and to prohibit misrepresentation as to the dates of manufacture of such products. (Assented to 29th June, 1897.)





FIG. 1.—MADAM LADYSMITH, THREE YEARS OLD. FLEECE, 8 POUNDS.

(Photograph furnished by C. P. Bailey & Sons Company, San Jose, Cal.)



FIG. 2.—PRINCESS MONTEREY, TEN MONTHS OLD. FLEECE, 4½ POUNDS.

(Photograph furnished by C. P. Bailey & Sons Company, San Jose, Cal.)



U. S. DEPARTMENT OF AGRICULTURE,  
BUREAU OF ANIMAL INDUSTRY.

D. E. SALMON, D. V. M., Chief.

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INFORMATION

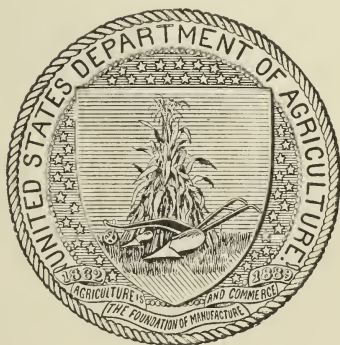
CONCERNING

THE ANGORA GOAT.

BY

GEORGE FAYETTE THOMPSON,

*Editorial Clerk, Bureau of Animal Industry.*



WASHINGTON:  
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1901.



## LETTER OF TRANSMITTAL.

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U. S. DEPARTMENT OF AGRICULTURE,  
BUREAU OF ANIMAL INDUSTRY,  
*Washington, D. C., November 23, 1900.*

SIR: I have the honor to transmit herewith the manuscript of an article entitled "Information concerning the Angora goat," by Mr. George Fayette Thompson, editorial clerk of this Bureau. There is much interest in this industry, and the Department receives thousands of letters of inquiry concerning Angora goats. An effort is made in this manuscript to treat all the topics that have been the subjects of these letters of inquiry.

It is estimated that there are about 400,000 Angora goats in the United States, and that our annual production of mohair is over a million pounds. It appears, therefore, that the industry should receive some attention from this Department, at least in so far as the collection and dissemination of information may be concerned, and I recommend that this article be published as Bulletin No. 27 of the Bureau of Animal Industry.

Respectfully,

D. E. SALMON,  
*Chief of Bureau.*

Hon. JAMES WILSON,  
*Secretary.*





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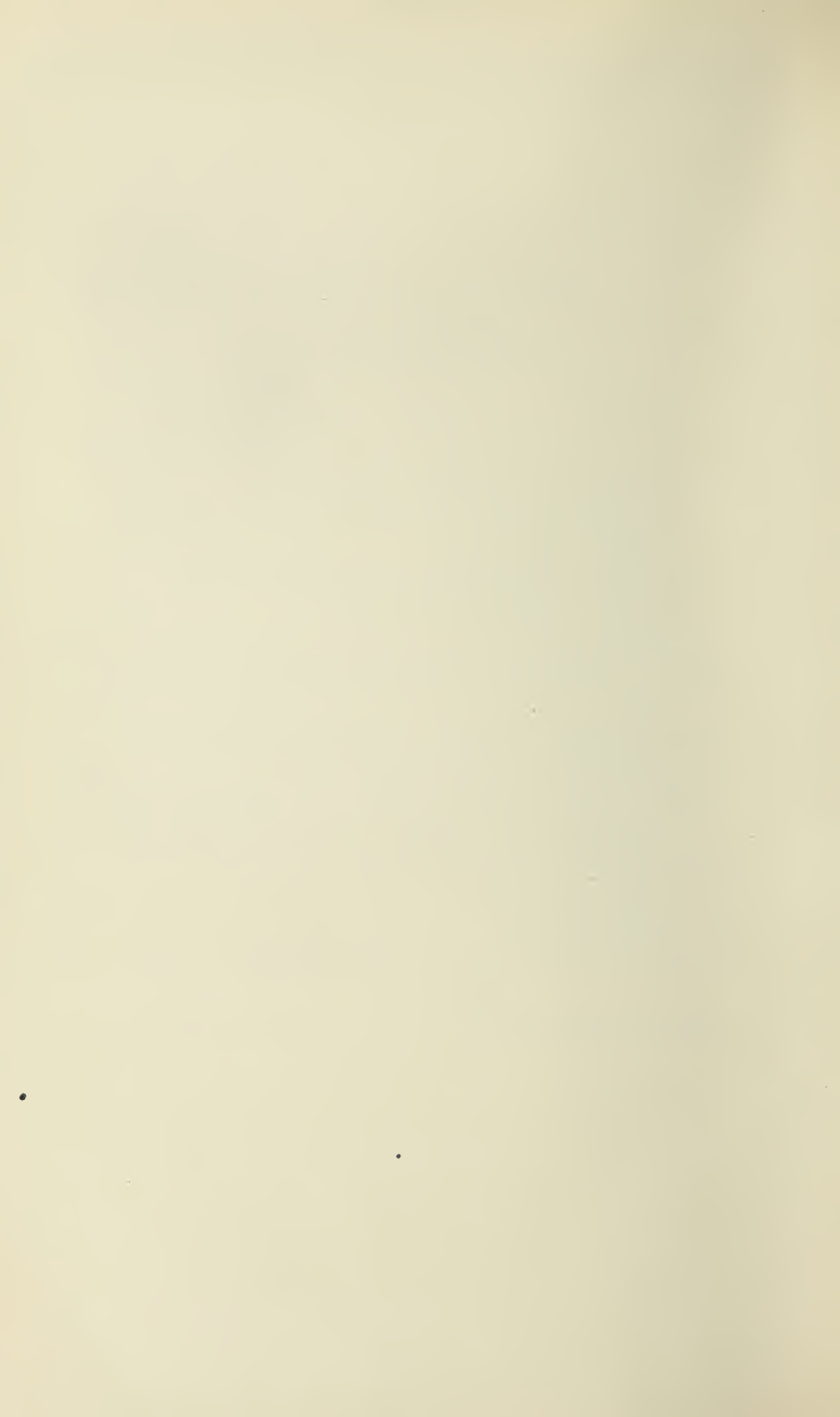
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# INFORMATION CONCERNING THE ANGORA GOAT.

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## PRELIMINARY REMARKS.

The goat has accompanied civilization into all parts of our country—not numerously, but persistently. He is everywhere, and is well known. There are very few people who have not seen a goat, and there are fewer still, no doubt, who have seen many goats. The comic writers, playing upon his peculiar habits, have brought him into disrepute, although these habits, to a large extent, are such as are recommending him for special favor at this time. His fame is as a denizen of vacant lots and back alleys, subsisting upon anything or nothing, and a foe to everything. So far as the general public is concerned, he has not been reckoned with as a useful animal and has been tolerated only as a pet for children.

During more recent years a great interest has been awakened in the goat, and it now seems that he is about to receive the consideration that is due him. One of the causes contributing to this awakening was an article in the Yearbook of this Department for 1898, entitled "Keeping goats for profit," by Capt. Almont Barnes, of the Division of Statistics of this Department. The information which this article contained was widely disseminated. The Yearbook was distributed to the extent of half a million copies, and, besides, in order to meet the growing demand, the article was reprinted separately and mailed to many thousands of inquirers at the Department for information on the subject of goats; and not alone the agricultural papers, but the daily press as well, took up the matter and exploited the good points of the goat industry. The article set forth, among other things, the great value of the goatskins which we import annually, and how we ourselves might easily produce them; the usefulness of the carcass for food, especially of the Angora breed; the exceedingly small expense involved in raising the animal, owing to his habits of feeding upon that vegetation which is in greatest abundance and which other ruminants refuse; the million of acres of land in the United States that might be made available for goat raising which otherwise would remain, as heretofore, unemployed.

The result of this wide distribution soon developed the fact that the goat was present in the United States in larger numbers than was supposed. This is especially true of the Angora breed; in fact, the number of common goats in the United States is less than 50,000. Although

very little has been said or written about Angora goats during the last forty years, they have been extensively bred in the Western States and Territories, especially in Texas, New Mexico, Nevada, Florida, California, and Oregon. In a general sense, all those animals which are a cross in any degree of the Angora goat are considered as Angoras, for the Angora and the common goat readily cross, and the latter frequently becomes the foundation stock of a good flock of fleece-bearing animals.

It is the purpose of this article to deal with the Angora goat only, and the effort is made to answer such questions as have been received by the Bureau from all parts of the country. These answers are based upon the experiences of those who have raised them, some of whom have been in the business forty years and more. Differences of opinion are found to exist on several important points, where each contestant appears to occupy plausible premises; but this is not at all strange when the history of the Angora goat is considered, for it is not certain that all of the animals imported as purebreds were pure; indeed, it is held by some of our leading breeders that there is no longer in Turkey or elsewhere any such thing as a purebred Angora goat. Besides, there has been no general register for Angora stock in the United States until within a year or two, and each breeder has been at liberty to judge points for himself. If a general Angora register had been established thirty or forty years ago, the industry would now be conducted upon somewhat definite lines, and most of the questions now arising as to points in breeding would have been settled. In this connection it should be stated that C. P. Bailey & Sons Company, of San Jose, Cal., have kept a private register of their goats since 1867, but there appears to be no other similar record.

#### ORIGIN AND HISTORY.

The purpose of this paper is to give prominence to those phases of the Angora goat industry that are of practical importance; therefore a brief space only will be devoted to the history of the breed.

Naturalists generally agree that there are about ten species of wild goats, all confined to Europe and the Himalayas of Asia. These are divided into two groups, as follows:

I. *The ibexes*.—These, according to Hayes, have, as a distinctive characteristic, horns “flat in front, with a horizontal triangular section, furnished with large transversal knots.”

II. *Goats proper*.—These, according to Hayes, have horns “compressed and carinated in front,” and, according to Wood, “may be distinguished from the ibex and the sheep by the peculiar formation of the horns, which are compressed and rounded behind and furnished with a well-developed keel in front.”

The second group is subdivided into two subspecies—*Capra falconeri* and *Capra ægagrus*. The latter is also known as the Paseng, the Bezoar goat, or wild goat of Persia, and is generally accepted as the goat from which the Angora is descended through *Capra hircus*, which is claimed to be the origin of all the common breeds of goats.

As to the parent of the Angora stock, there is a difference of opinion between the two best-known writers on the subject—John L. Hayes, author of *The Angora Goat*, etc. (1882), and S. C. Cronwright Schreiner, author of *The Angora Goat* (1898). The one takes the position that it is descended from *Capra falconeri*, the other from *Capra ægagrus*. Owing to the additional information which has been obtained since the appearance of Hayes's book and which is embodied in Schreiner's work, there can hardly remain a doubt of the correctness of the contention that the Angora goat descended from *Capra ægagrus*.

Schreiner, who has made extensive research, has described these two subspecies as follows:

*Capra falconeri* has a beard which extends from the chin to the shoulders and chest, and long spirally twisted horns, the twist being outward from the base. The males, when old, become whitish all over. The ewes have a beard confined to the chin, and small horns with a slight spiral twist. It is a native of the Western Himalayas, northern Afghanistan, and possibly of Persia; it is also found generally in Cashmere and on the Tibetan side of the Himalayas. Fossil remains show that it is one of the oldest types of goats.

*Capra ægagrus*<sup>1</sup> is chiefly remarkable for its enormous horns, which are larger proportionally than in any other ruminant animal; they approximate the triangular in form, transversely rigid, and are bent backward as in the domestic varieties, being scimitar-like in shape of curve, and having no spiral twist. Large horns of *Capra ægagrus* measure 40 inches along the curve, but a length of upward of 52½ inches, with a basal girth of 7 inches, has been recorded. It stands somewhat higher than any of the domesticated varieties of the goat (an adult male stood 37 inches at the withers), from which it further differs in its short and powerful neck, its stouter limbs, and slender body. In the female the horns are exceedingly diminutive or are altogether wanting. The fur, which over the greater part of the body is short, is of a grayish brown color, with a black line running along the entire length of the back, while the under surface of the neck and the beard, which is present in both sexes, are of a brown color. In the winter coat the hair on the neck and shoulders is rather longer than elsewhere, and in the same season, in the colder part of the animal's habitat, a coat of woolly fur is developed beneath the hair.

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<sup>1</sup>There is evidence that in classic times this goat was widely distributed over the Grecian Archipelago, although in Europe it is now found only in Crete, the island of Antemelo, in the Cyclades, and perhaps also in Guire to the northeast of Eubœa. Eastward it is found in the hills and mountains of Asia Minor, being especially common in the Taurus range, and it extends thence through Persia into Baluchistan, Sind, and Afghanistan. In India its range does not extend beyond the western side of Sind. It is found in Sind and Baluchistan in hills a little above the sea level; in the mountains of Persia it ascends to an elevation of 11,000 feet to 12,000 feet.—Schreiner.

The Angora breed of goats originated in the vilayet of Angora, in Asia Minor, but it is not known when this was. Some have ventured to say that it was 2,400 years ago. There is pretty strong evidence which goes to show that they were a distinctive breed when Moses was leading the Israelites out of Egypt. Goats' hair was spun by the Israelites for curtains and other purposes for use in the temple.<sup>1</sup> In the story recorded in I Samuel (chapter 19) of the artifice of Michal in deceiving the messengers of Saul by placing an image in the bed in place of David and giving it a pillow of goats' hair, is believed by Pen-nant to refer to a pillow made of the Angora fleece.

The city Angora, or Enguri, the capital city of the vilayet of Angora, is the ancient Ancyra, and is located about 220 miles south by south-east from Constantinople. Angora was the seat of one of the earliest Christian churches, and was probably established by the Apostle Paul. The province is mountainous to a considerable extent and furrowed by deep valleys. It is about 2,900 feet above the level of the sea. Of the climate Mr. H. A. Cumberbatch, British consul at Angora (1895), and quoted by Schreiner, says:

The climate is extreme. In the months of January and February the thermometer will mark a minimum of 10° F. for several days at a time, reach as far as 0° F., whilst in June and July the maximum readings of 85° F. are maintained day after day, with little or no rain. The country is covered with snow in the winter, rain and snow falling frequently. In 1894 the total rainfall at Angora was 8.12 inches, but that was an exceptionally dry season. For the first six months of 1895 the rainfall was 10.10 inches, which is somewhat above the average; the heaviest rainfall in twenty-four hours having been 1.20 inches.

It was here that this famous goat reached its perfection—and such a state of perfection as has not yet been reached by the goats of either the Cape of Good Hope or the United States. That the altitude, the soil, or the climate, or all of them together, had much influence in producing this fleece-bearing goat is supported by strong evidence. Dr. John Bachman and the *Encyclopædia Britannica* both state that the fineness of the hair of the Angora goat may perhaps be ascribed to some peculiarity in the atmosphere, “for it is remarkable that the cats, dogs, sheep, and other animals of the country are to a certain extent affected in the same way as the goats.” The same opinion was

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<sup>1</sup>Take ye from among you an offering unto the Lord: whosoever is of a willing heart, let him bring it, an offering of the Lord; gold, and silver, and brass, and blue, and purple, and scarlet, and fine linen, and goats' hair.—Exodus xxxv, 5, 6.

And every man, with whom was found blue, and purple, and scarlet, and fine linen, and goats' hair, and red skins of rams, and badgers' skins, brought them.—Exodus xxxv, 23.

And all the women whose heart stirred them up in wisdom spun goats' hair.—Exodus xxxv, 26.

And he made curtains of goats' hair for the tent over the tabernacle: eleven curtains he made them. The length of one curtain was thirty cubits, and four cubits was the breadth of one curtain: the eleven curtains were of one size.—Exodus xxxvi, 14, 15.



expressed by Captain Conolly, quoted by Southey (1848): "It is remarkable that wherever these goats exist the cats and greyhounds have long silky hair also—the cats all over their bodies, the greyhounds chiefly on their ears and tails." These statements lead Schreiner to the conclusion that the atmosphere is the chief factor. He says: "At any rate, there seems to be no doubt that a limited and comparatively well-defined region around the town of Angora possesses in a degree unapproached elsewhere in Asia Minor, and probably in the world, those conditions favorable to the development of the soft, silky, lustrous white mohair goat." Too much credit must not be given to the atmosphere of Angora in the production of mohair. That it has a marked influence on animals anywhere is generally accepted. The experience of the Angora breeders of the Cape of Good Hope and the United States shows that, with the best animals, a fleece equal to any produced by Turkey may be obtained. There are other and stronger reasons why the mohair of these two countries is not equal to that of Angora province, chief among which is the adulteration of the blood. Besides, the breeders of this country have learned that the feed of the animal has a telling influence on the quality of the mohair in the same way that it has a pronounced effect upon the meat.

Mr. Henry O. Binns, who had about twenty years of experience with these goats in the vilayet of Angora, says the pure animals were about bred out in 1863. The reason for this was the extensive crossing with the common Kurd goat, reference to which has already been made. As early as 1839 there ceased to be a demand for the spun yarn of Asia Minor, owing to the fact that Europe could spin the yarn at much less cost; but there was a European demand for the raw hair which exceeded the supply. This condition of things led to complications and a mixture of breeds from which the mohair world has not yet recovered. There can hardly remain a doubt, however, that, with the recent renewed interest in the industry, and with the intelligence that the breeders will bring to bear, the Angora goat industry will soon be placed on the highest plane.

#### THEIR HISTORY IN THE UNITED STATES.

The history of the Angora goat in the United States has been marred by the carelessness or indifference of occasional writers for the press who have been often inaccurate as to dates or facts, and also by others whose interests have doubtless led them into exaggerations. The real facts of its history in the United States, however, are so few and so simple as to prompt that venerable breeder, William M. Landrum, to say that they would make but a very small book.

During the Administration of President Polk, the Sultan of Turkey requested of him that he recommend some one who would experiment in the culture of cotton in Turkey. Accordingly, Dr. James

B. Davis, of Columbia, S. C., was recommended, and he received the appointment. The work done by Dr. Davis appeared to be highly gratifying to the Sultan, and so, upon his return, in 1849, the Sultan, desiring to reciprocate the courtesy of the President, presented him with nine of the choicest goats in his dominion. Col. Richard Peters, writing in 1876, says of these animals: "These doubtless were selected from the herds of Angora, a district of country lying among the Taurus Mountains, which traverse Asiatic Turkey, and which derives its name from its principal city, situated about 200 miles east of Constantinople." It does not seem, therefore, that Dr. Davis encountered any great difficulty in securing this first importation of Angora goats into this country; but the following extract from the Country Gentleman of 1856, somewhat romantic and a little exciting, was signed by one Richard Allen, of Tennessee. The article, in full, shows that he was probably of that class of writers of history whose personal interests were to be subserved:

It may not be out of place in this connection to remark that great credit is due to Dr. Davis, of South Carolina, for the enterprise he exhibited in the introduction of the goat to this country. He was at the time in the employ of the Turkish Government, at a salary of \$15,000, engaged in experiments upon the growing of cotton in the Sultan's dominions. He went out upon the recommendation of President Polk, to whom an application was made by the Turkish Government for the services of some competent Southern gentleman familiar with cotton culture. While there he determined to procure the goat from its native wilds. The story of the journey would be too tedious for my brief letter, and I will merely add that, with an expensive outfit at Constantinople, a perilous journey of months, and the loss of many men and camels, he succeeded in capturing and carrying off eleven of the famous animals, whose fleeces, in the shape of shawls, are so highly prized and coveted by the ladies of all civilized nations and for which prices almost startling have been paid by the wealthy.

Such a tale of fortitude and determination, added to the information in another paragraph in the same letter which stated that the entire yield of the particular flock about which he was then writing had been engaged in the city of New York at \$8.50 per pound, from which point it was to be shipped to Paisley, Scotland, for manufacture into the shawls mentioned above, no doubt assisted in the sale of goats at \$1,000 each.

In 1863, Hon. George A. Porter, of Baltimore, himself a breeder of Angoras, wrote to Mr. Diehl that, while occupying the post of United States consul at Constantinople, he "procured and shipped for Dr. Davis the first of these goats that were ever brought to this country." Just how much Mr. Porter was acting upon the courtesy of the Sultan it is difficult to ascertain.

Of the nine Angoras imported by Dr. Davis, seven were does and two were bucks. Besides these, according to Colonel Peters, there came in the same lot one purebred Tibet doe, several head of crosses between the Angora and Tibet goats, and quite a number of grade does bred from the common short-haired ewes of the country and his Angora bucks. Plate I shows a pair of the Angoras imported by Dr.

Davis. The first is a buck, weighing 155 pounds and carrying a fleece of 7 pounds; the second is a doe, weighing 102 pounds, carrying a fleece of  $4\frac{1}{2}$  pounds. These pictures appeared in the *Country Gentleman* in 1856 and were furnished that paper by Col. Richard Peters, who was at that time the owner of the goats. Dr. Davis, not being familiar with goats, thought these were the famous Cashmere goats which furnished the fiber for the costly Cashmere shawl, and they were called Cashmere goats for many years after their introduction into the United States. The records show that as late as 1861 Mr. William M. Landrum, the veteran breeder of Angoras, was awarded a silver goblet and \$25 in cash for the introduction of the first Cashmeres [Angoras] into California. Hon. Israel S. Diehl, writing on "The Goat" in the Annual Report of this Department for 1863, gives descriptions of different varieties of Angoras in Asia Minor, among which was one variety which might very easily be mistaken for the Cashmere. He says:

There is also a second or other variety of Angora, or shawl, goat besides those generally described. This goat has an unchanging outer cover of long, coarse hair, between the roots of which comes in winter an undercoat of downy wool that is naturally thrown off in spring or is carefully combed out for use. A remarkably fine species of this breed exists throughout the area to which the white-haired goat is limited, and similar breeds prevail all over the highlands of Turkish and Persian Armenia, Koordistan, and at Kirman; and, although some flocks yield finer fleeces than others, it is called the same wool or under down as the wool of Cashmere and Tibet, and samples of the wool of the Tibetan and the double-wooled goat of the banks of the Euxine show them to be but varieties of the same species.

This goat is of a larger size than those of the more southern Turkish provinces and its wool finer, and is the variety probably introduced by Dr. Davis from Asia Minor as the Cashmere, and now erroneously so called throughout the country, as all the importations of this country, as far as we can learn, were shipped from ports on the Mediterranean or Constantinople, several thousand miles from Cashmere or Tibet, through inhospitable and almost untraveled countries for Europeans, which goes far to prove the so-called "Cashmere goat" to be the Angora.

Mr. Diehl, in the same article mentioned above, describes the Cashmere goat. The difference between it and the Angora of our country will be seen to be distinct. The similarity of the variety of Angora described above and the Cashmere is marked, especially in respect of the downy undercoat. His description of the Cashmere is as follows:

This variety of the wool-bearing or shawl goat, as it is often called, is spread over Tibet, Northern India, and the regions to the east of the Caspian Sea. It is somewhat smaller than the common and Angora goat. It has straight, round, pointed horns, pendent ears; is covered with straight and falling long, fine, flat, silky hair, with an undercoat in winter of a delicate greenish wool, of but 2 to 3 ounces each, which latter alone constitutes the fabric from which the celebrated shawls are made. Ten goats furnish only enough for a shawl  $1\frac{1}{2}$  yards square; but this is often found differing both in color and the quality of the wool, or rather the fine hair, of which the fleece is composed. The principal points in the most approved breeds are large ears, the limbs slender and cleanly formed, the horns not spirally twisted, and, above all, the fleece being long, straight, fleecy, and white.

This soft undercoat of the Cashmere is known as "pashum," and is the product from which the famous Cashmere shawl was made. Mr. William M. Landrum, who was probably the first in this country to discover that our so-called Cashmere goat was the Angora instead, through investigations made about 1861, also states that there is a difference between the Cashmere shawl and the Paisley shawl. These are often referred to as being the same shawl. While the filling of both shawls was of pashum, the chain of the latter was made from the kid fleece of the Angora. Pashum is combed out in the spring, and is worth, when cleaned, in the country where it is produced, from \$1.50 to \$2 per pound. A writer in the Penny Magazine (London) in 1838 says:

The wool is first combed from the animal in the mountains of Tibet, where it is sold for nearly 5 shillings a pound. It is packed in baskets and sent to Cashmere, where it pays a duty on entry. It is there bleached with rice flour, spun into threads, and taken to the bazaar, where another tax is paid upon it. The thread is then dyed, the shawl is woven, and the border sewed on.

So much for the Cashmere goat.

The first (or Davis) importation of Angoras was frequently exhibited at fairs, and always attracted much attention. The reports made by the officials of fair associations were always favorable, sometimes flattering, and as is known, after years of experience, not always correct. The United States Agricultural Society, which held an exhibition in Philadelphia in 1856, awarded to Col. Richard Peters, who was then the owner of the Davis goats, \$100 as a special reward. The following report was made upon the animals:

They have become known as Cashmere goats from the pure white color and fineness of their fleeces, and their undoubted Eastern origin. The fleeces from the bucks weigh from 6 to 7 pounds, those from the ewes from 3 to 4 pounds. The flesh of the crosses is superior to most mutton, tender and delicious, making them a desirable acquisition to our food-producing animals.

The ease with which they are kept, living as they do on weeds, briars, browse, and other coarse herbage, fits them for many portions of our country where sheep can not be sustained to advantage, while their ability and disposition to defend themselves against dogs evidence a value peculiar to this race. They are free from all diseases to which sheep are liable, hardy and prolific, and experience has proven that they readily adapt themselves to all portions of the United States. The bucks breed readily with the common goats, the second cross yielding a fleece of practical utility, whilst the fourth is but little inferior to that of the pure breed.

A flock of valuable wool-bearing goats can be raised in a few years by using grade bucks.

The following extract is from a report of the special committee appointed by the American Institute at its exhibition in New York City in 1855:

They have examined with much interest the fleece submitted to them, and as well from their own observations as from the results of a microscopic examination made





FIG. 1.—ANGORA BUCK. (DAVIS IMPORTATION, 1849.)



FIG. 2.—ANGORA DOE. (DAVIS IMPORTATION, 1849.)



and certified to by several gentlemen of scientific eminence well known to them, they are convinced that the fiber of these fleeces is identical in character, and fully equal in value, to that from which the highly prized Cashmere shawls were made. The fleeces on exhibition, and now under examination, amount to from 4 to 8 pounds each.

The enterprise exhibited by the introduction of these animals into this country and their propagation can not be too highly regarded.

First. These animals are long lived, such being the case with the whole goat race.

Second. They are prolific, breeding at the age of 1 year, with a period of gestation of about five months, and yielding twins almost universally after the first birth.

Third. They are hardy, experience having shown that they will thrive well in our climate from Georgia to New England, and that they require coarse and cheap food—as the inferior grasses, briers, bushes, etc.—such as is refused by other grazing animals.

Fourth. They produce a fleece of from 4 to 8 pounds, valued at from \$6 to \$8 per pound in France, or Paisley, Scotland, for the manufacture of those high-priced shawls. These fleeces can be produced, when the animals become numerous, at a less cost than the common sheep's wool and far superior to it.

Another fact of great practical value to our agricultural interests is the facility with which the Cashmere goats breed with the common goats of our country.

From these and other considerations, of the correctness of which your committee have entire confidence, it will be obvious that every encouragement should be shown this new enterprise—a bold and judicious movement.

B. P. JOHNSON.

CHARLES J. GOODRICH.

JAMES J. MAPES.

A committee for the New York State fair, held in New York City in 1854, reported as follows:

The undersigned can not avoid the conclusion that in the goats imported, and whose descendants have been the subjects of this examination, we have the first-known specimens of that valuable race of animals from whose hairy fleece the celebrated shawls are manufactured known in commerce by the inappropriate name of "red camel's hair." As the fleece does not appear to have deteriorated in the comparatively warm climate of South Carolina, the distinctive character of the race is hard to be obliterated, while in the northern region of the United States this character can not well fail to be permanent. Viewed in this light, the introduction of this animal promises to be of more value to the agriculture of the United States than that of almost any other animal.

JAMES RENWICK.

JOSEPH R. CHILTON.

W. H. ELLET.

Many other similar reports were made by committees of fair associations about that time, but those quoted serve to show how favorably goats were regarded. It should be stated here, however, that there are in these reports many erroneous statements. For instance, the goat is not the Cashmere; they drop twins occasionally only, and their fleece never did bring as high as \$6 to \$8 a pound.

All of the Davis importation of purebred Angoras were purchased in 1853 by Col. Richard Peters, of Atlanta, Ga., with the exception

of one owned by Col. Wade Hampton, of South Carolina; one sold by Dr. Davis to Mr. Davenport, of Virginia, and one to Mr. Osborne, of New York. Colonel Peters later imported others from Asia Minor, which did not prove to be very satisfactory, as they were gummy. The Savannah Republican in April, 1860, said that Colonel Peters was selling his goats at very high prices, having received \$1,500 for one buck; that the president of an Illinois fair was so pleased with one of the bucks on exhibiton there that he offered Colonel Peters "the weight of the buck in silver for it." Colonel Peters is looked upon as the real founder of the Angora goat industry in the country. Although Dr. Davis had crossed the Angoras with common goats to some extent, it was Colonel Peters who demonstrated the possibility of erecting an excellent fleece-bearing flock by judicious crossing with common goats. Other importers were Hon. W. H. Stiles (1860), 8 head; Diehl & Brown (1869), of Ohio, of 135 head; Price Maurice,<sup>1</sup> of Australia (1870, 1871, 1872, 1873), who imported 16 bucks and 168 does for his sons, who were settled at Fort Clark, Tex.; John S. Harris (1876), then of California, now of Oakley, Idaho; C. W. Chenery (1867), of Massachusetts. A. Eutyichides (1869?), a native of the province of Angora, brought over a flock numbering 175 and made a vigorous effort to bring them more largely to the notice of the American public. After several years of doubtful success he returned to the Old World to engage in farming in Thessaly.

John S. Harris says that, with the exception of Hon. Israel S. Diehl, he is the only man who ever went into the province of Angora for the mohair goat; other goats that were imported came through agents.

These are about all of the earlier importations from Asia Minor. Of recent years some excellent individuals have been brought from Cape Colony. Turkey has since 1881 prohibited the exportation of Angoras, and Cape Colony, observing with jealous eye the rapid progress now being made in the United States, has placed an export duty upon Angoras of £100 (\$486.65). W. Hammond Tooke, writing of the mohair industry of Cape Colony in the *Agricultural Journal of the Cape of Good Hope*, says they have nothing to fear from Turkey or Australia, but that the United States gives them more concern, as the breeding of Angoras for mohair is no longer considered an experiment in the United States.

Previous to the outbreak of the civil war there were many fair-sized flocks in the South and Southwest. There were smaller flocks in many of the Northern and Western States. Mr. Diehl, in 1863, mentions flocks containing from 300 to 1,200 and more in Atlanta, Ga.; Gallatin and Nashville, Tenn.; Russellville, Frankfort, Paris, and

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<sup>1</sup> This statement is made upon the authority of Gustav A. Hoerle; but C. P. Bailey says he has never been able to verify the presence of this importation in Texas, and I am informed that Col. W. L. Black, of Texas, also fails to locate them.—G. F. T.



Georgetown, Ky.; Greenville, Lebanon, Montgomery, and Bucyrus, Ohio; Green County, Ind.; Chicago, Decatur, and Evanston, Ill.; St. Louis, Maramee, and Fayette, Mo.; Baltimore, Md.; Leavenworth, Kans.; Brownsville, Pittsburg, Washington, and Philadelphia, Pa.; New York City, N.Y.; Boston and Belmont, Mass.; Austin, Tex.; and in the States of Iowa, Michigan, Minnesota, California, and in other localities. So it will be observed that they were so distributed as to test in a most excellent manner the several phases of our climate upon them. On account of the civil war, however, little or no progress was made in the South, where the largest herds were located and where most interest was manifested, until about 1866. Soon after the close of the war they spread out into the West, principally into Texas and California, where the natural conditions were most favorable, and where they have, quite unknown to the public, increased wonderfully in numbers and, in the light of recent events, in importance also.

In the spring of 1861 Colonel Peters sold two 16-months-old bucks to William M. Landrum, of San Joaquin County, Cal. They were sent from Atlanta to St. Louis by express; thence by steamer to Fort Leavenworth, and thence on foot to California with a wagon train. They subsisted on the journey by browsing on what other animals rejected, and arrived at their destination uninjured and in good condition. Mr. Landrum exhibited them at the State fair the same year, being awarded a silver goblet and \$25 in cash. One of the goats, after siring about thirty kids, died of snake bite; the other one, famous on the Pacific coast under the name of "Billy Atlanta," lived to be 10 years old, and then was accidentally killed. He had sired about two thousand kids. This buck won the sweepstakes prize over all competitors at every State fair down to his death; and Colonel Peters stated in 1876 that his numerous descendants were scattered all along the Pacific coast, and that "his blood courses in the veins of over one-half the Angora flocks in that part of the Union, estimated to approximate 70,000." Colonel Peters further stated "that about one-third of the purebreds introduced into California were contributed from the first and original (Davis) importation of 1849, and that their blood is present in probably two-thirds or three-fourths of the Angora stock on the Pacific coast."

Mr. Landrum was in California from 1850 to 1883, after which time he went to Texas. He is now at Laguna, Uvalde County, Tex., and, with his sons, is still interested in the Angora goat industry. The Chenery importation was shipped by the British consul in Angora to Constantinople, where they were sorted by Mr. John R. Thompson and the American consul, and shipped by a sailing vessel to Boston.

Ten head of the Chenery importation were taken to California and disposed of as follows: A pair to C. P. Bailey, San Jose, at \$500 each; a pair to Thomas Butterfield & Son, Watsonville; a pair to William M. Landrum, San Joaquin County; a pair to Mr. Pierson, Santa Cruz; and a pair to Flint & Sargent, Monterey County. This lot was the

beginning of the breeding of thoroughbred Angoras in California. Prior to this but two Angora bucks had been taken into the State—the two which were sent by Peters to Landrum.

The Diehl and Brown importation was first taken to Ohio; and afterwards the entire lot, it is believed, was taken to California, where the goats were widely disseminated through the State, some of them bringing as much as \$200 a head.

In 1875 William Hall bought of Butterfield & Son their entire flock of 150 goats for about \$17,000. The same year John S. Harris joined Hall as a partner, and the following year went to Turkey and purchased ten does and two bucks. These also went to California. It is said that the blood of this importation was felt beneficially in every good flock in the State.

In 1893 C. P. Bailey imported from South Africa two bucks. Pasha (see Pl. VII) was one of these, and his get has been sent to nearly every State in the Union. In 1899 Mr. Bailey imported another buck from Cape Town. This animal is the last importation into the United States.

The statement has already been made that the first goats taken to California were purchased of Colonel Peters by Mr. Landrum. In 1872 Mr. Landrum purchased all the goats under 8 years of age which Colonel Peters then owned and took them to California.

Mr. Julius Weyand, secretary of the Angora Goat Breeders' Association of California, in a report to that organization in 1891, gives a brief review of the industry in that State. He says that in 1885 there were about 100,000 Angora goats in California, but between that date and 1889, owing to the admission into the United States of mohair as carpet wool, and thus paying but  $2\frac{1}{2}$  cents duty per pound, the number decreased to 55,000. Mr. C. P. Bailey is authority for the statement that practically all the goats in California are of the Angora breed.

Large flocks of Angoras have been sent from California and Texas into Nevada, Oregon, and Washington, where they have been divided into smaller flocks and become the property of many different farmers. Texas has also sent many over into New Mexico.

Although the foregoing facts show that the Angora goats have been slow in gaining a standing among the industries of the country, it can hardly be doubted that there are now in motion such energies as will place the industry upon a rational basis. It is believed that the Angora industry is already emerging from the chaos which has enveloped it for fifty years past, and that it will soon be as firmly established as any other stock interest in the United States. A recent issue of *Wool Markets and Sheep* says:

After careful review of the situation, past and present, the Angora goat industry of this country we clearly conceive is destined to be one of very great importance in our agricultural economy. Our broad acres and diversified geological and climatic conditions give ample scope and abundant suitable conditions for the carrying on of the business to a large extent and profitable issue.

## DESCRIPTION OF THE ANGORA GOAT.

Mr. Israel S. Diehl, bearing a commission from the Commissioner of Agriculture, visited the province of Angora in 1867 to investigate the mohair industry. Here, where there were once in operation 1,700 to 1,800 looms working up the mohair fleeces, he found but a few hundred remaining, struggling hopelessly against the fatal competition of European machinery and the aggressive policy of the European Governments. The fleeces were exported to Europe for fabrication, thus rendering Turkey tributary to the monopoly then existing in this industry in Europe. The European demand for the raw material was so great and the facilities to fabricate it so much better and cheaper that Turkey was compelled to export the raw mohair. In order to meet the demands for manufactured mohair the Turkish growers, without wise foresight, began the practice of crossing the Angora upon the common Kurd goat of that country. The inevitable result of such a policy was to bring about to a large extent the conditions which have obtained in the United States, namely, a breed of Angoras of uncertain purity. This fact, coupled with the belief that proper care was not exercised in selecting the animals exported to this country and that they have been carelessly bred here, has led some excellent judges of Angoras to express the belief that there are really no purebred Angoras in the United States.

These conditions have produced various types of Angoras, even in Asia Minor, and a minute description of one would not apply to all. Some strains have fox-like ears, while others and generally preferred ones have long pendent ears. In this country care must always be exercised to cull the offcolored kids out of the flock. These may be the result of atavism, where a cross was made upon a common goat either red or black; but it is reported by some that different colors are found in the province of Angora among what were supposed to be purebred animals. Mr. Gustav A. Hoerle, one time corresponding secretary of the American Mohair Growers' Association, and an authority of note on Angora goats, mentions having yellow and red goats in his own herd, and said that "some of the kids became quite a variety show."

Mr. S. C. Cronwright Schreiner, of Cape Colony, in his excellent work on "The Angora Goat," has compiled the descriptions of almost all writers on Angora goats. He quotes Mr. Henry O. Binns, who spent twenty years in the mohair districts of Asia Minor between 1864 and 1886, and who studied them during that time, as follows:

The pure Angora in his prime is about the size of a five-months-old Cape [Cape of Good Hope] kid, with small thin horns, wooled all over the body, their hair almost covering the eyes; exceedingly delicate, and so subject to disease that no one cared to keep him. What is to-day called the purebred Angora is like the English thoroughbred horse—the result of crossing and recrossing until body, class, points, etc., have attained to what is generally considered that the thoroughbred Angora ought to be.

Mr. Schreiner's opinion of what a purebred Angora is, given on page 58 of his book, is as follows:

I think it is certain that the original purebred white mohair goat was a small, very refined, delicate animal, of great beauty, clipping at twelve-months' growth of fleece about from 2 to 4 pounds (according to age and sex—kids considerably less) of dazzling white, fine, soft, silky, very lustrous mohair, curling in ringlets from 10 to 18 inches long, with merely the minimum of oil in its fleece requisite to the growth of hair of the highest excellence, so small in amount as to be inappreciable to the unskilled observer. It was perfectly clothed in every part; it had short, silky, curly hair about the face and down the lower parts of the legs to the hoofs; a soft, silky, curly "kuif" (tuft on the forehead), and small, thin, light-colored horns. The ewe was of course smaller and finer than the ram, and had only one kid at a birth (of this there is abundant evidence).

Although Mr. Schreiner thinks the Davis importation to this country was among the best bred goats that ever left Turkey, it will be noticed from the pictures of two of them shown herein (see Pl. I, p. 16), which were said by Colonel Peters to be excellent, that the mohair does not extend "down the lower parts of the legs to the hoofs." It is doubtful if any such Angoras may be found existing at this time, however probable they might have been in their original purity.

The following is quoted from Dr. John Bachman,<sup>1</sup> of Charleston, S. C., who was appointed by the Southern Central Agricultural Association of Georgia to report on the Angoras belonging to Colonel Peters, of Atlanta:

The Angora goat, more especially the varieties it has produced, is described by Hasselquist (1722-1752), Buffon (1707-1788), Pennant (1726-1798), and others as in general of a beautiful milk-white color, with short legs, and black, spreading, spirally twisted horns. The hair on the whole body is disposed in long pendent spiral ringlets; its ears are pendulous, and the horns of the female, instead of divaricating as in the male, turn backward, and are much shorter in proportion.

Mr. Diehl<sup>2</sup> (1863), adopting to some extent the same language as Dr. Bachman used, describes the Angora as follows:

The Angora goat, and more especially the varieties it has produced, are probably the most valuable of all the goat family, and have been ably described by Naturalists Buffon, Pennant, Hasselquist, and travelers as good-sized animals, generally of a beautiful milk-white color, with short legs and wide-spreading, spirally-twisted horns. The wool is described as a very beautiful curled or wavy hair of silvery whiteness, with a fine downy wool at its base, and this hair is disposed in long, pendent, spiral ringlets on the whole body. The horns of the female, instead of spreading, as in the male, turn backward, and are much shorter in proportion. Those of the male are long, spirally twisted, but the size and direction are very different from the common goat, being generally extended from 15 to 30 inches in height on each side of the head, while those of the female are near the ears. The hair, or wool, often sweeps to the ground, and is usually from 5 to 12 inches long, especially in the older bucks, but then not so fine.

This brief description, he said, applied to all the Angoras which he saw in western Asia, Europe, and in this country, which amounted to

<sup>1</sup> "Report on Asiatic Goats," United States Agricultural Report, 1857, p. 58.

<sup>2</sup> "The Goat," United States Agricultural Report, 1863, p. 222.



several thousands, except as to a difference in ears, for, while some had pendent ears, others which he examined had ears exceedingly small and short.

Mr. Diehl also mentions a variety of this goat in Angora which was hornless. There is reason to believe that an intelligent system of breeding would produce such result. Such an end has been attained with cattle and is entirely feasible with goats.

In this connection, interest will be manifested in a note from Col. William L. Black, of Fort McKavett, Tex., who says he has an interest in a flock of hornless Angoras in Iowa. He says that there is no doubt that it is a "distinct breed." His experiment the first season was seven hornless kids from eight does with horns, and the second season (1900) he raised "fully 90 per cent of hornless kids." Hornless Angoras, however, were not very rare in Asia Minor, and it may be that there were some in the vilayet of Angora. They were called Kastamoonnee<sup>1</sup> Angoras, taking the name from the vilayet of that name. The vilayet joins that of Angora on the north and forms a part of the northern boundary of Asia Minor. Several years ago Mr. William M. Landrum imported one of these Angoras. He was known as "Hornless Johnnie." Mr. Landrum was not very proud of this animal, as would appear by this from his pen in 1899:

He sheared 10 pounds at six months, but his hair was too coarse for anything but wigs. I bred him to a lot of purebred Angora ewes and got the best lot of bucks for low-grade ewes that I ever saw; got \$50 premium for them over purebred Angoras. I paid \$2,000 for him, and lost him the second year. If he had lived I would have injured my purebred flock with him. As it was, I killed for mutton several ewes got by him from purebred ewes to get them out of the flock. I could not certify them to be pure Angoras.

It is to be hoped that Colonel Black's efforts to originate a hornless variety will produce better results than were obtained from Hornless Johnnie. Of course, the presence or absence of horns need not necessarily have any influence upon the qualities of a goat.

Probably the best description of the American Angora is that given by Mr. Gustav A. Hoerle, which is given below. Reference is to first-class animals, and not to grades of various degrees:

The body should be long, and the rounder the better; the back straight, with shoulders and hips equally high from the ground; shoulders and quarters heavy and fleshy; chest broad, indicating good constitution; the legs should be short and strong; the head is in shape like that of a common goat, but less coarse and cleaner cut; the horns are heavy, with an inward twist, inclining backward and to the outside.

Except just the face and legs, from the hocks and knees down, the entire animal should be densely covered with mohair, and neither the belly nor the throat nor even the lower part of the jaws should be bare, but should have a good covering of fine, silky mohair, and with the finest specimens the mohair tuft on the forehead should be well developed. The mohair should hang in long, curly ringlets. However, not every Angora goat which shows these perfectly curly ringlets of the mohair

<sup>1</sup>This name is variously spelled—Kastamoonnee (preferred by Lippincott), Kastamouni, Kastamuni, Castambool, Castambul, Costambone.

must necessarily be considered a thoroughbred; whilst, on the other hand, there are quite a number of really handsome and valuable thoroughbreds whose hair has not that much-desired shape, owing entirely to climatic and nutrimental influences, as well as to advancing age. Thoroughbreds and all nonshedding grades can easily be recognized by the peculiar shape of "points" of their mohair, each end showing plainly that it has been "cut off," instead of running gradually to what is called a "steeple point," which is found with the hair of all kids and of shedding grade Angoras. The plainer and longer this blunt point shows toward the end of the year the better is the fiber of the mohair, and the more valuable is the hair for combing purposes and the smaller the percentage of noilage and waste. After shedding, as well as nonshedders after shearing, the mohair grows very rapidly for some months. It grows slower toward the end of the year, and, with very bad climatic and nutrimental influences, almost stops growing entirely. Therefore, if the late fall shearing is practiced, Angoras need good care during winter. The more even in length and quality the mohair is on all parts of an Angora body the better. When in full fleece the body of a fine thoroughbred Angora should appear like a right-angled square, with no gaps or deficiencies of covering, especially below the belly.

Mr. Hoerle is encountering some opposition to his ideas of the nonshedding varieties. Because of this difference of opinion the Bureau submitted the question, "Do thoroughbreds (fourth cross or above) shed if not sheared?" to a large number of the breeders of the country. A summary of the replies received is given elsewhere (see p. 79).

A characteristic of the common goat that is very objectionable is the ever-present offensive odor from the bucks; in the Angora breed this odor is entirely absent, except at the rutting season, and then it is noted in a slight degree only. The odor in a fleece of mohair is milder than that in a wool fleece, and is not at all offensive.

#### NAMES OF THE BREED, THE SEXES, AND THE MEAT.

##### NAME OF THE BREED.

There was no difficulty in dropping the name "Cashmere" as soon as it was known that the Angora goats did not belong to that breed, but there are a few uninformed persons who still refer to them as Cashmeres. Owing to the prejudice existing against "the goat," it has been suggested and strongly urged by some that the easiest and quickest manner of ingratiating the Angora goat with the people is to drop the word "goat" altogether and call them simply "Angoras." In other words, it is proposed to pretend that this animal does not belong to the goat family. It would still be a goat notwithstanding, and students of science would forever be pointing out the pretense. Besides, the use of the name "Angora" alone would almost certainly lead to the commission of errors. Everything of American origin is referred to as being "American," and the various animals from the vilayet of Angora could with equal propriety be called "Angoras." For instance, the long-haired cat from that province is quite well known in this country and is called an "Angora."

The American people desire to know things by their right names. This is a principle more deep seated than mere prejudice. A great amount of prejudice had to be overcome before the tomato was generally used for food, and we can imagine in a degree what was said of the first man who ate an oyster or a mushroom. But these "poisonous" and "nasty" things are now recognized everywhere not only as delicacies but as most nourishing food. So will it be with the flesh of Angora goats when it is generally known that it is palatable and nutritious. A perusal of the many reports received by the Bureau of Animal Industry shows that there is no objection to Angora goat meat in those localities where these goats are raised.

The Angora has everything to recommend it—nothing to condemn it; and there seems to be no real good reason why its identity should be lost by dropping the name "goat." Whoever sees the animal can not fail to admire it, and whoever eats of it is quite certain to like it if he is at all fond of mutton; and the prejudice against it will disappear as the industry expands and develops throughout the country. Indeed, a knowledge of the Angora goat shows that the existing prejudices will not hold against it; that those prejudices are based upon the reputation of the common goat.

#### NAMES OF THE SEXES.

There are no well-established names for designating the sexes of goats. The male is indiscriminately called "male," "sire," "buck," "ram," and "billy," and the female, "doe," "ewe," and "nanny." Oftentimes a writer uses two or more of them in one article, showing that he has not adopted any of them. One of the questions submitted to the men was this: "As to designation of sex—do you call the male "buck," "billy," or "ram," and the female "ewe," "nanny," or "doe?" More than half of those who replied called the male "buck," and nearly half called the female "doe." The objection of one writer that the plural of the female, "does," conflicts in reading with the verb "does," will not hold, as a sentence will not "make sense" with the one word used for the other. In this bulletin it has been decided to refer to the sexes as "buck" and "doe."

The castrated animal is called "wether," as with sheep. In Cape Colony he is called a "kapater," and the sheep wether is there called a "hamel;" but there is no reason why we should adopt these terms.

The young is called the "kid." There seems to be absolute unanimity in this matter.

#### NAME OF THE FLESH.

Our correspondents are apart in the use of the terms "Angora mutton" and "Angora venison" for the flesh of the Angora goat, but the greater number of them call it by the former name. Those who pastured their goats upon some grass or clover as well as upon browse,

and then finished their fattening with grain, produced a meat so nearly like the best lamb that it required experts to detect a difference; these people use the term "Angora mutton." In other instances, where the animal is fattened by browse alone, there is imparted to the meat a game flavor, which may be intensified or reduced by the character of the browse; people who use the meat under these conditions call it "Angora venison."

Some correspondents, with evident thoughtlessness, refer to the meat as "goat meat." This is a serious blunder if a successful effort is to be made to popularize the use of Angora mutton, as there is a wonderful difference between the flesh of the common goat and that of the Angora. For this reason the prefix "Angora" should never be omitted.

#### THE USES OF ANGORA GOATS.

A large class of people in some way have become possessed of the opinion that the goat is practically a useless animal. They do not reach conclusions upon investigations, however, and do not discriminate between the different breeds. To them a goat is a "goat," and there the argument ends. Investigations prove that the Angora goats are not only classed among the most useful of the domestic animals, and have been so classed for thousands of years, but their usefulness is manifested in a variety of ways. The fleece, called "mohair," furnishes some of the finest of fabrics among ladies' goods and is used in various other manufactures; their habit of browsing enables the farmer in a wooded locality to use them to help in subjugating the forest; their flesh is exceedingly delicate and nutritious; the milk, though not so abundant as with the milch breed of goats, is richer than cow's milk; their tanned skins, though inferior in quality to the skins of the common goat, are used for leather; their pelts make the neatest of rugs and robes; they are excellent pets for children; a few of them in a flock of sheep are a protection from wolves and dogs; their manure is noticeably helpful to the grass which follows them after they have cleaned away the underbrush. These are all vital subjects of varying degrees of importance, and will be considered here under appropriate heads.

#### BROWSING AND PASTURAGE.

*Ability to clear brush land.*—Goats are browsers by nature, and there is no vegetation they will eat in preference to leaves and twigs of bushes. While this fact would at once establish them as an intolerable nuisance in an orchard or garden or any other place where desirable shrubbery is growing, it also shows that they may be of great value in many localities where it is desirable that underbrush be destroyed. They are omnivorous eaters and seem particular to avoid that character of vegetation which other kinds of live stock prefer. Every leaf



and every twig within their reach is greedily eaten, even to most of the bushes and weeds that are considered poisonous to other ruminants, while a remarkably few weeds are passed by. They will desert the finest clover and blue grass for such an outlay.

The inherent tendency to climb leads them to hillsides and rocky cliffs, and they prefer such situations to any of a level character. Here nature meets their necessities by dwarfing the bushes so they may be browsed easily; the soil is quickly drained in the event of rain—for they do not like wet land; and the stones serve to keep the feet trimmed properly by the wearing process. This is the situation that the goats would choose; but the farmer might choose to turn them into a dense mass of brush and weeds anywhere and they will at once begin to convert it into the most beautiful pasture.

In those localities where valuable land is completely subdued by brush the goats are considered of more value for the purpose of clearing it than for their mohair or meat. They thus become one of the farmer's important tools. Their value in this respect must be measured by the value of the land which they will render cultivable. It is said that in Oregon, where Chinamen had been paid as high as \$20 an acre for clearing off brush, goats had done the work even better. Sprouts will spring up behind men's work, but goats will keep them down until they cease to appear. True, the goats require more time than men, but their work is better. In this connection an article which appeared in the *Country Gentleman* of January 11, 1900, is of special interest:

In 1870 Mr. Landrum exhibited ten head at the Oregon State fair. They were put in a brush pen, where they ate out the brush and peeled the saplings during the fair. As the Willamette Valley was covered with brush and farmers were paying Chinamen \$20 and Americans \$22 per acre for grubbing, Mr. Landrum suggested the employment of goats instead; and, to demonstrate their effectiveness as substitutes for grubbing, he left them on 3 acres of slashed brush. At the end of the first year the roots were dead and discolored, and at the end of the second year they were rotten and the land mellow for the plow. Then he drove up his California herd of 2,400, the result of fifteen years of breeding, and sold them in small lots from Jacksonville to Portland, scattering them throughout the Willamette Valley. He says he sold as many more later to go to Oregon, where there are now 80,000 head, mostly in lots of 25 to 300. \* \* \* He believes that they are more profitable than any other farm animals. They have cleared hundreds of thousands of acres of brush land in Oregon now in cultivation.

Through the courtesy of Dr. J. R. Standley, of Platteville, Iowa, three illustrations are presented which, as he naively states, shows woodland "before goating, during goating, and after goating." Words can not possibly emphasize the work of goats as brush destroyers so strongly as these illustrations. The first (Pl. II) shows simply a dense mass of hazel, plum, crab apple, several varieties of oaks, and weeds as high as the fence. This land was as nearly like that shown in the other

illustrations before goats were turned in them as it was possible to find. The second (Pl. III) shows a piece of land while goats were operating on it. It will be observed that the brush is dead, and that the weeds only appear to be alive. The third (Pl. IV) shows the "finished product" after two years. The goats had been in the tract shown in Plate III but twelve months when this photograph was taken. The shrubbery that was too large for the goats to "ride down" was cut down, the goats completing the work by eating the soft twigs and leaves. The last piece is ready for cultivation or for pasture for cattle, sheep, or horses. When the goats were first turned into this tract it was as full of brush as the tract shown in Plate II, and they were allowed to run upon it but two years.

The beneficial effect of the goats is not all in the clearing of the land of brush. In many parts of the country nutritious grasses "come in" after the goats have done their work. In the tract shown (Pl. IV) blue grass has by natural methods formed a most excellent pasture. The final result is that the goats not only put such character of land in condition for cultivation, but actually go further by converting a wilderness into a good pasture, thus preparing the way by cheapest methods for sheep, cattle, or horses.

Dr. Standley says that in that part of Iowa where he lives "100 Angoras to each 40 acres of this land for two years would make it as clean as a lawn and as perfectly set in blue grass as a lawn." He has 500 acres of such land cleared in this manner. This land now supports one steer to each acre, whereas before it was cleared there was not enough grass on an acre to make a sheep or goat a single feed. The same experience is reported by Mr. Q. M. Beck, of Beargrove, Iowa, who says: "After running them on such lands here a few years we have a fine blue-grass pasture."

Dr. Standley's experience in the employment of goats for clearing land is extensive, and thousands of goats have been taken into Iowa upon his recommendation. It will interest the readers of this paper to see the following from his pen:

Land can be cleared of the worst brush known to this country for a little less than nothing by Angora goats. Some one asks how. Simply this: Angora goats will pay a profit and live on leaves and weeds, leaving the land cleaner and nicer than can be done in any other way. Many persons have the idea that goats bark the trees and in that way kill them. They also think that goats wholly eat the hazel and other small brush. There is nothing in this. Goats are no worse to bark trees of any kind than sheep. The way in which goats kill brush is by continually cropping the leaves, which serve as the lungs of the brush. The continued cropping of the leaves makes the brush, as it were, sick, caused by lack of nourishment. This sickness sinks to the very extremity of the roots, thus preventing sprouting. Any and all kinds of bushes are in this way easily killed. Some kinds of brush and some kinds of stumps are of course much harder to kill than others. Many varieties are entirely killed by one summer's trimming of the leaves. Almost any are killed by two years'

trimming. To clear the worst brush do not cut anything that the goats can reach or bend. The tallest or largest is better not cut. All trees and saplings should be cut, and the goats will keep all the sprouts down. If stumps are allowed to sprout one year before the goats are turned in, the sprouts need not be cut. About 200 goats for 40 acres of brush will in two or three years make the land as clean as a garden. If the pasture has only patches of brush, turn in a few goats and it will make more grass for other stock than if the goats were not in. They eat very little grass when they can get leaves. Goats even like weeds better than grass. In clearing brush land in the old way by grub and plow there are always left many eyesores in the way of brushy nooks and bends and steep places which can not be plowed.

There are millions of acres of land in nearly every State in the Union which might be much more than doubled in value by the use of Angora goats at no cost at all. Commence and count the worth of your land, then the fencing, and see if you can afford to leave your brush land so nearly worthless for all time. Then count the cost of grubbing and plowing, if indeed such land is susceptible to the plow. No man can afford to grub and plow brush land in this day and age of the world any more than he can afford to plant a large field of corn without a planter. In hilly or mountainous portions of the country the Angora goat can be made to do a great service in the way of clearing the underbrush, when the land will bring grass after the brush is gone. It would surely be a paying business to buy up large tracts of rough land in the mountain districts, or indeed any brush land in the United States, and clear the brush and set in grass. Afterwards, if the owner liked other stock better, he might dispense with the Angoras. In many places where the country is too bare to furnish sheep with sufficient feed goats will do exceedingly well. In many places where leaves are abundant and there is scarcely any grass, making it impossible to profitably keep sheep, goats will do admirably well.

While Dr. Standley's experience is that goats will not to any appreciable extent peel the bark off shrubbery, the experience of others is quite the reverse. Mr. H. T. Fuchs, of Tiger Mills, Tex., writes in the *Farm and Ranch* of October 6, 1900; that one summer he purchased some Angora goats which came from a range where they had killed out all the tall sumac trees. On his own range was much of this brush, and his goats had never touched it. It was a treat for the newly purchased goats, and they "peeled the bark nicely and cleaned off every sumac tree in the pasture as high as they could reach (about 6 feet), and in a few days you could see the white, smooth-peeled trees with their dead tops for miles all over the pasture." He adds that fifty men with hatchets could not have done the work so fast or with so much pleasure. Further, he says the goats that had all along been in the pasture "took the hint and went at the bark peeling also." All of which goes to show that the goat is an intelligent animal and is capable of learning much by observation.

Mr. Q. M. Beck, of Bear Grove, Iowa, writes that he had goats on a 23-acre tract, fenced, in one corner of which were 5 acres of clover suitable for hay. The goats not only cleared the way for the clover, but ate the browse instead of the clover. The goats were turned into this piece last June (1900), when they could hardly be seen on account of the brush, while now (September) they can be seen anywhere in it.



Of no less interest is the following extract from an article by Col. William L. Black, of Fort McKavett, Tex., who writes from an experience of many years:

The brush question is a most serious one in a great many of our States. So long as land can be kept under cultivation the brush can be kept down; but when it is once thrown open to pasture briars and brush of all descriptions begin to grow and soon cover the entire surface. Even in our own State of Texas many millions of acres are growing up into brush thickets and will sooner or later become worthless for pasturing cattle, and in many of the Western Territories the same conditions exist. It is supposed that this has been produced by an increase in the rainfall, but I am inclined to think it is not altogether due to this fact. That brush and trees are indigenous to many of our so-called arid districts can be very easily proven by the great quantities of roots that the present inhabitants dig out of the ground for fuel purposes. Not a tree can be seen for hundreds of miles, yet these great roots can be found almost everywhere on the prairies and are a substantial witness to the fact that there was an abundance of trees there at some time or other. Before this portion of the United States was occupied by the white man it was a common practice of the Indians to burn the high prairie grass every fall or winter in order to hunt wild game that was so abundant in this part of the country. Buffalo and deer were as common then as cattle and sheep are now, but the grass was so high in places they could not be seen, and the Indian would burn it off to be able to hunt them more readily. This undoubtedly destroyed much of the growth of trees and, in my opinion, is the true explanation of the roots that are now found in many parts of west Texas, New Mexico, and other Western Territories.

The question is a very important one; and if the goat can be used to keep this growth back, it is certainly well worth the attention of many of our landowners, who may, in a few years, find their land practically worthless. A personal friend writes me that "many pastures are growing up to oak brush and hazel brush in the North, and in New England they are bothered with ferns (called brakes), berry bushes—blackberries, raspberries, etc." This kind of fare would be "peaches and cream" to a goat, and in a year or two the owner would be relieved of a great nuisance, the goats would grow fat, and the land would be restored to a proper condition for grazing other stock on it. Another correspondent in Massachusetts speaks of a certain small island he owned which was so densely covered with brush as to be utterly valueless except to grow mosquitoes. I hear of many parts of the East that are seriously troubled with brush, where many thousands of acres are of no use for grazing purposes, and the profit in farming will not justify the cost of grubbing it. In the Southern States many farms have become worn out and are growing up into brush and weeds. The Angora goat is the proper animal to employ to put these lands in a condition either for cultivation or grazing cattle. But a number of my correspondents have asked me what they could do with the goats after they had cleared the land. In reply to this I will say they can well afford to slaughter them and feed them to hogs, but this is not necessary now. The fashion has changed since I slaughtered goats for their hide and tallow, and there is no trouble in selling all the goats you send to any of our large meat-packing markets.

Mr. E. H. Jobson, having in mind the markets as well as the clearing of land, writes as follows:

The best and most effective way to clear brush land with Angora goats is as follows: It will not be necessary to put up a very high fence; 4 feet of close fencing is plenty and will be sufficient to keep the goats in. The proportion of goats is two and one-half to three goats to an acre of ordinary thick brush land. I believe the cheapest way to clear your land is with yearling wethers, as will be seen later on. If wethers



are used, you must fence off one-third of the land you desire cleared, so the goats can not get to it. The proper time of the year to turn them loose on the brush is after the spring rains have ceased, which is usually about the 1st of June. By this time the leaves will be well matured, and the goats immediately proceed to strip the brush of its foliage, which leaves the stems and branches exposed to the hot sun, which cooks them and kills the brush from its deepest roots to its topmost branches. The hot sun being the most effective, and there being no rains to revive the sap, it makes quick destruction of the brush. By the time that the goats will have the largest portion of the land cleared it will be well along in August, and it will now be time to turn them in on the piece of land fenced off at the start, which is fresh and abundant. In connection with the brush feed allow them one ear of corn a day, and at the end of six weeks they will have cleared the remainder of your brush land, and the corn you have been feeding them will have them in prime condition to be thrown on the market, where they will bring as much as, if not more than, you paid for them. The result is that you have cleared your land, at most, at an actual cost of 50 cents an acre, and besides that, your land is now ready to set in blue grass, which will enable you to rent it to sheep growers at \$2.50 per acre, thereby causing the idle land to produce an income rather than a constant incumbrance of taxes, with no profit at all.

An illustration of the value of Angora goats in clearing land is given by Mr. Abe Blackburn, of North Yamhill, Oreg., who says that he now has a pasture that will keep 200 sheep which did not have grass enough to keep a goose when he turned his goats into it a few years ago. The goats have killed out the brush, and the grass has taken its place.

The following quotations from others who have had experience with goats as brush destroyers show how well the work is done, and, to some extent, the character and kinds of brush eaten:

When confined in small bushy pastures they have been profitable in clearing the land. Some of the finest vineyard lands in California have been cleared by goats. A farmer in western Oregon, who has for several years run a small flock of goats in a pasture with dairy cows, says the pasture now produces double the grass it did before he purchased the goats. Lands formerly producing nothing but brush and ferns are now covered with clover and bunch grass. A farmer in Iowa writes as follows: "Their value as brush-land cleaners can hardly be estimated. To a person who has never seen the results of the application of Angoras to brush lands, a ride through my blue-grass pastures is a revelation. Where three years ago the ground was densely covered with an undergrowth of hazel, crab tree, oak, blackberry, and other brush, it is now growing the finest blue grass. At present I have over 600 acres which have been reclaimed, and a conservative estimate would be that the value of the land had thereby been enhanced at least \$10 an acre."—*C. P. Bailey, San Jose, Cal.*

Angora goats like a variety of food; they live principally on leaves and young and tender barks and twigs of bushes and small trees, but, if necessity compels them, they will also eat weeds and grasses, and for a time do well on them. The quality of a goat pasture, therefore, depends upon the amount and variety of brush, especially evergreens—as cedar, hemlock, live oak, holly, etc.—which it contains, for on these, as well as the tender bark and twigs of all kinds of bushes, they live principally in winter; and the more of it they find the less grain and hay do they require during the cold spells.—*G. A. Hoerle, Ridgewood, N. J.*

For clearing out thickets and undergrowth of all kinds there is nothing better than these goats. Their pasture will soon look as clear as a cleaned-up picnic ground as

high as they can reach when standing on their hind legs. In this way they can reach 5 or 6 feet high, and they bend down everything they can reach with their fore legs. The brushier the range the better, and the more different kinds of brush and weeds on their range the better they will thrive.—*H. T. Fuchs, Tiger Mills, Tex.*

They more than pay for the expense of keeping them by clearing my land. They clear off the willows, haws, buck brush, and squawberries and leave a good blue-grass pasture where there was a nuisance in the first place.—*J. D. Lewis, Colo.*

He will eat buck brush, black oak, hickory, and all other kinds of brush, jimson weed, ironweed, smartweed, and every other weed that grows, leaving the grass for other animals that will feed after the goats.—*R. C. Johnston, Lawrence, Kans.*

There is good grass here (Wyoming), but my goats won't eat buffalo grass. They will browse on sagebrush, grease wood, scrub cedar, scrub pine, laurel, and willows; but they refuse to eat the best grass that grows.—*W. W. Eheler.*

In Arizona the principal and favorite browsing is live-oak brush.—*J. P. Holder, Ariz.*

The statement is made in a previous paragraph that goats are omnivorous eaters, apparently preferring those kinds of vegetation that other animals do not eat. The information in the quotations just given indicates that they will feed upon a great variety of plants. With the object in view of ascertaining the different kinds of plants that these goats feed upon, the Bureau requested several stock raisers in various States and Territories in the country to report answers to the question, "What kind of browse do your goats have?" Some information of this character is in the quotations above and more will be found in the replies copied below, credit for the statements being given to the State only:

All kinds of bushes, such as scrub oak, cedar, etc., in Texas. In this part of New Jersey most everything that exists in Texas, except scrub oak and live oak, may be found.—*New Jersey.*

Black oak, sumac, buck bushes, briers, and all kinds of weeds. They will not eat grass if they can get browse.—*Missouri.*

Buck bush, elders, sumac, prickly ash, briers, grapevines, jack oak, ash, sycamore, basswood, and hickory. The latter they do not seem to care much for.—*Kansas.*

Brush, weeds, and grass.—*Texas.*

In southern New Mexico they have live oak and mahogany. They do best on scrub oak.—*New Mexico.*

Oak, hazel, vine maple, ash, willow, rosebush, thimbleberry, blackberry, buck bush, service berry, crab apple, haw berry, soft maple, and some fir.—*Oregon.*

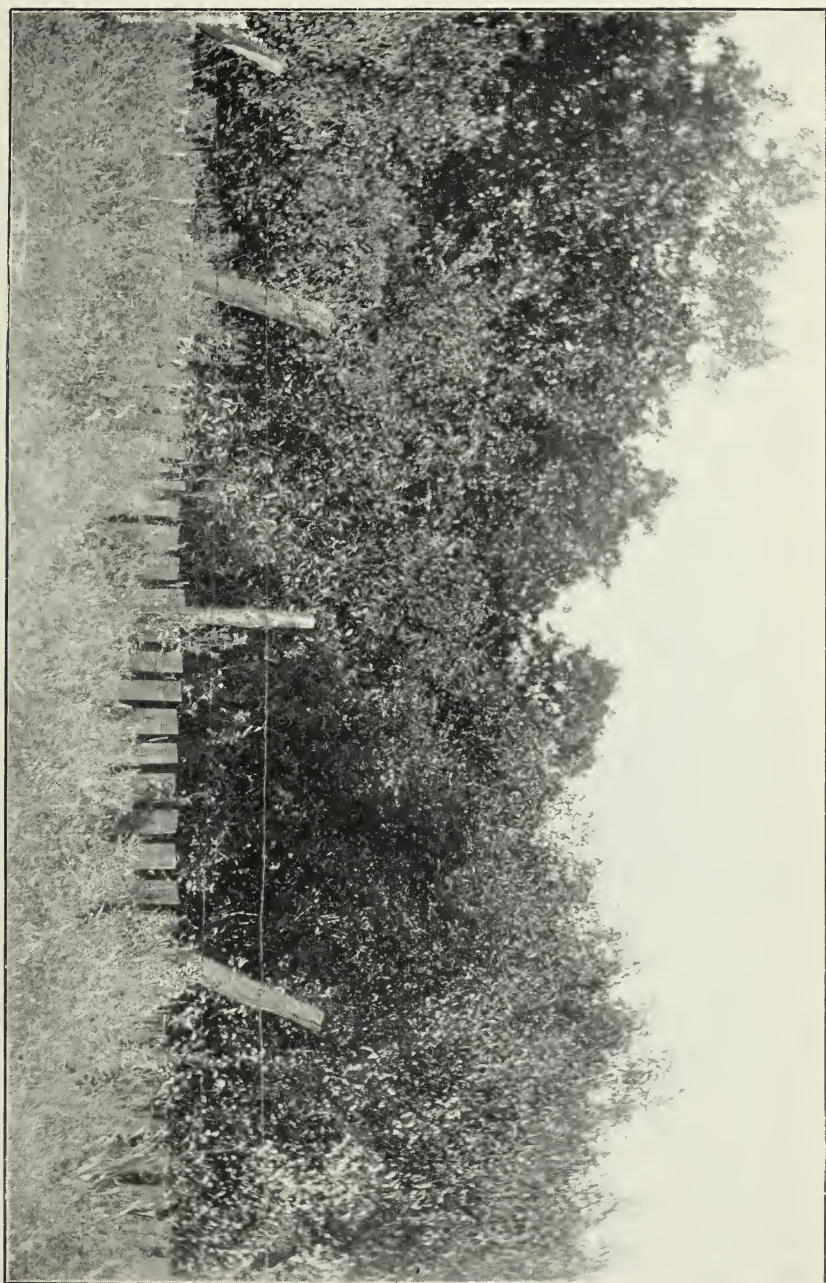
Mostly mountain oak and other classes of underbrush. They will not eat grass if brush is obtainable.—*New Mexico.*

Oak and hazel.—*Oregon.*

Maple, hazel, willow, fir, thimbleberry, cascara, vine maple, cherry, alder, and salol.—*Oregon.*

Willow, ash, and buck bush on low, swampy land in summer time, and straw and fir brush in winter months.—*Oregon.*

Apple, fir, oak, ash, willow, maple, and poplar.—*Oregon.*



BRUSH LAND " BEFORE GOATING "

(Photograph furnished by Dr. J. R. Standley, Plattville, Iowa.)





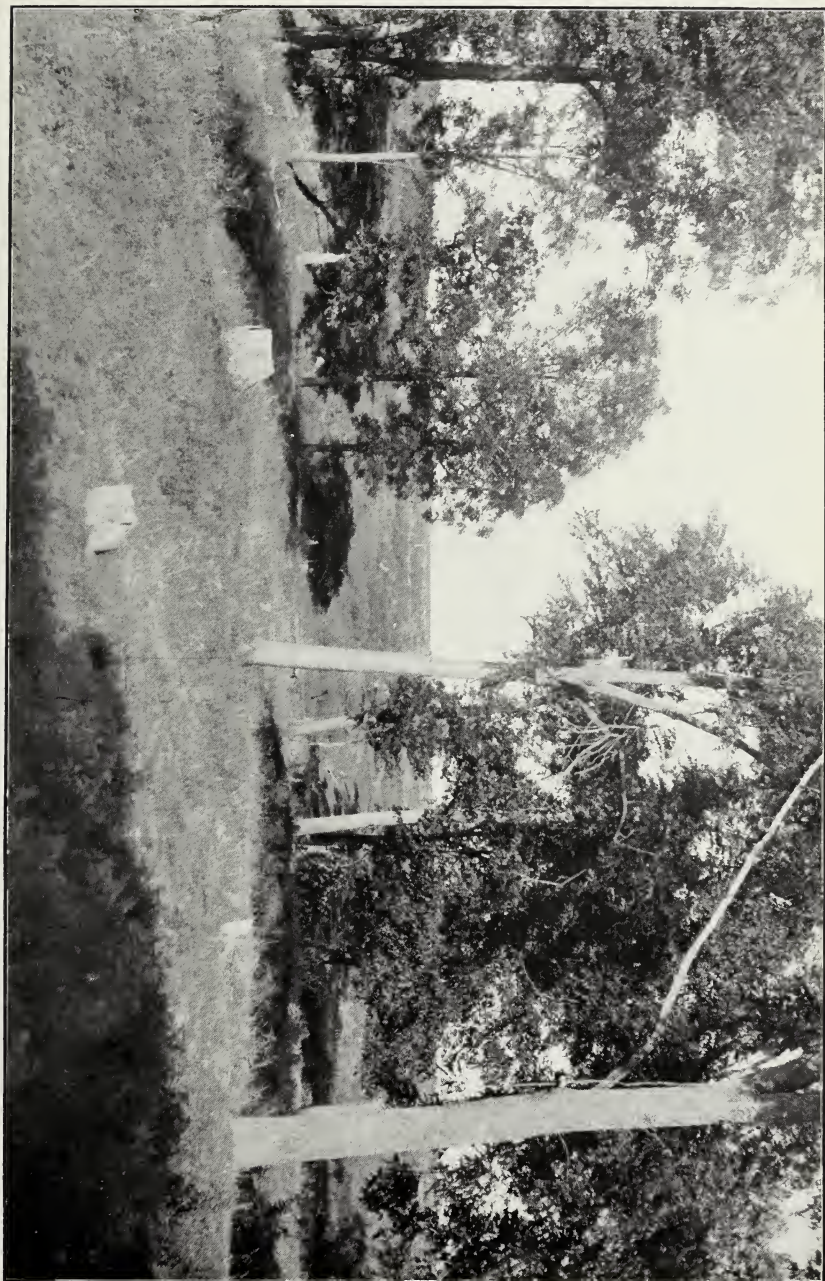


BRUSH LAND "DURING GOATING," AFTER TWELVE MONTHS.

(Photograph furnished by Dr. J. R. Standley, Plattville, Iowa.)







BRUSH LAND "AFTER GOATING" TWO YEARS.

(Photograph furnished by Dr. J. R. Standley, Pateville, Iowa.)





We have almost all kinds of browse in Arizona, but scrub evergreen oak predominates. We have millions of acres of it, too.—*Arizona*.

Oak, hazel, ash, fir, and madrona.—*Oregon*.

Live oak, post oak, hackberry, elm, black persimmon, black jack, mesquit, mountain cedar, wild plum, etc.—*Texas*.

Several kinds of oak, sumac, grass, and weeds. They will eat almost any kind of underbrush.—*Texas*.

Brush, weeds, briars, mullen, and thistles.—*Iowa*.

All of the undergrowth common to southern Iowa—plum, hazel, four or five kinds of oak, elm, three or four kinds of willow, crab apple, and buck bush (sometimes called turkey berry).—*Iowa*.

*Browsing supplements feeding*—The browsing habits of goats is important in connection with the question of feeding. In some places they obtain enough browse to carry them through the winter. This is especially true in the Southwest, where there is so great an abundance of live oak. If snow is on the ground, or for other reasons the goats are deprived of opportunities for foraging, the trees are cut down for them. They pass through the winter in good condition with other feed. Wherever they are deprived of opportunities for browsing, they must be fed. Browsing saves feed. As far north as Nevada Mr. Bailey's goats subsist the winter through on sagebrush.

*Browsing adds game flavor*.—It is noted that many of the correspondents heretofore quoted state that it is the browsing of the Angora that gives to the meat the game flavor, thus leading some to name the meat "Angora venison." It is also stated that when deprived of browse and fed on grass and grain the game flavor disappears. There is no reason why this should not be true, for it is a well-known fact that flavor may not only be fed into meat, but into milk and eggs as well.

*Common goats as brush destroyers*.—The fact must not be overlooked that the brush-destroying habit is common to all kinds of goats. The common goats will do the work as well as the Angoras. The latter are employed for the purpose because they are more plentiful and because there is profit in their progeny for breeding purposes, their mohair, and their meat.

*Preserving brush land for browsing*.—Up to this point consideration has been given to these goats as a means of clearing land for pasture or for cultivation. There is much brush land in the United States which will support goats but is good for nothing else. If this is to be devoted to goat raising, it is, of course, not desirable that the brush be entirely exterminated. In this event a goat raiser should have several fenced areas and change the goats from one to the other frequently. They should not be permitted entirely to denude one field before they are transferred to another. It is true, however, that no matter how perfectly a woodland may be cleared of brush it will be

covered over again with briars and brush in a few years if constant attention is not given it. It is not difficult to overpasture such land, and if the goats adopt the "peeling" practice the brush and trees will have greater difficulty in recovering.

*Grass and weeds as pasturage.*—Considerable interest has been manifested in the Angora industry in those localities where browse is not available and where grass and weeds form the only pasturage. A great many inquiries of this character have come to the Bureau, and the Bureau, in turn, has referred the matter to the breeders of the country. The replies received have been numerous, and show a difference of opinion. The predominant opinion, however, seems to be that the goats thrive best under the conditions most nearly like those of their original home. It is certainly the best argument to say that goats prefer any kind of browse to the most nutritious of grasses, which is true, and therefore browse is better for them than grass. While the more economical conditions obtain where there is an abundance of browse, it is not definitely settled that the goats will not thrive well on common pasture grasses. It is the opinion of the writer that this question is still an open one, as some successful breeders have had goats on the grass range for thirty years. From the standpoint of the goat's preference, there is no question that browse is the better food, and this in itself is a forceful argument.

There is always expense in connection with pasture grasses, but there is little or none with browse. One of the chief reasons why goats are receiving so much consideration at this time is that they are practically inexpensive feeders, and so all items of expense must be figured on if profit is to result. Pasturage, unlike browse, is not available all the year through. Therefore in prairie locations feeding in winter is a necessity. One of the recommendations in favor of Angora mutton is that it has the flavor of venison. This flavor is imparted by the browse, and is absent in the mutton made from grass or grain feed. Many claim that the animals make a better growth among the bushes than on open pastures, and that the quality of the fleece is much better. Contrary to this, however, is the opinion of Mr. Philo Ogden, of California, who says: "The fact is that the brush disappears from my range and the fleeces become heavier, with less wax or gum, and has more luster. Further, 75 per cent of the young stock are larger than their parents and shear more and finer hair." He says, also, that his experience in raising Jersey cattle was similar, in the respect that as they were taken out of brush pasturage and grown on grass pasturage they obtained a larger frame, so much so that sales failed because of a suspicion that they were not purebred.

Opinions of several correspondents of the Bureau are given in the paragraphs following:

It is not advisable to raise goats for their mohair on farms on which they will be obliged to feed to a large extent on grass and forage plants which are suitable for sheep.—H. M. Williamson, Portland, Oreg.

My experience is that on plains, and with grass as the only food, thoroughbreds would not do well, while the lower grades may do fairly well so long as the altitude is sufficient. Usually the mohair is somewhat dry and coarse where grass is predominant.—*G. A. Hoerle, Ridgewood, N. J.*

Where there is grass and brush, they leave the grass and eat the brush. They prefer browsing.—*Cook & Buck, Oskaloosa, Kans.*

Brush and weeds are the proper feed for goats, but they will do fairly well on grass alone.—*Harris & Baylor, Montell, Tex.*

They must have some brush.—*U. S. Grant, Dallas, Oreg.*

Experience has proven that they will do as well on prairie farms as on any other place, but they should have artificial shade for hot weather.—*E. H. Jobson, Lake Valley, N. Mex.*

High-bred stock will do specially well.—*V. Cladek, Larwood, Oreg.*

They will do well anywhere that they can get green food.—*Abe Blackburn, North Yamhill, Oreg.*

Angoras will do well on prairie farms if they are changed into different fields often or have a large pasture.—*Oscar Tom, Angora, Oreg.*

They do well on prairie farms, but do better on bushy or hilly land. One of the advantages of Angoras is their adaptability to rugged bush land which is unfit for other stock.—*C. P. Bailey, San Jose, Cal.*

Angoras will do well on grass and weeds, but will do much better if they can get considerable browse also.—*Josephus R. Barnette, Globe, Ariz.*

Only in small numbers will they do well on grass and weeds, but where they are kept in large numbers they need a good deal of brush and timbered country. Of course, they will do well on prairie if they get some corn.—*H. T. Fuchs, Tiger Mills, Tex.*

They will do first-rate on prairies, where grass and weeds are the only pasturage; but they will then have to eat the feed which the other stock require, whereas, on brush ranges the capacity of the land for carrying sheep and other grass-eating stock is not lessened by the presence of Angoras.—*W. G. Hughes & Co., Hastings, Tex.*

I pastured two summers on grass and clover, and they did as well as when on leaves and weeds. I am confident that a farm cleared of brush can successfully be used for Angoras.—*J. R. Standley, Platteville, Iowa.*

They need a great variety of feed and rough range, with plenty of pure, clear water.—*W. T. McIntire, Kansas City, Mo.*

They do well while the grass is green, but do not like dry grass or weeds, and always do better when they get some brush. They will have to be fed in winter on prairie farms.—*H. I. Kimball, Maxwell City, N. Mex.*

*Pasturing with other stock.*—So far as the goats themselves are concerned, they may be kept in the pastures where there are sheep, cattle, and horses. Their presence is in no way obnoxious to any of these animals. It has already been pointed out that a few of them in a flock of sheep are a protection against dogs. However, it is not best for the goats that they be kept in pastures with horses. This is especially important if there are kids, as the horses have a habit of playfully chasing any animal that is not large enough to defend itself, and they are apt to strike the kids. It is also important that the kids should not be in pasture with hogs, which are liable to eat them.

*Number of goats to an acre.*—This is a question frequently asked, but certainly no thoughtful person expects a definite answer. The number will depend, first, upon the object in pasturing on brush land, whether it is to kill the brush or to use it as a permanent pasture; and second, upon the quantity of feed obtainable. While one acre might be as dense as a jungle, another might have small thickets alternating with grass plats. Thus it will be seen that a definite answer can not be given to this question.

#### MOHAIR.

*Quality of the fiber.*—The word “mohair” is the technical name for the fiber of the Angora goat which is used in the manufacture of fabrics. The word comes to us, through the old French “mohere,” from the Arabic “mukhayyar,” meaning mohair cloth.

Besides the mohair there grows upon the Angora goat a short, stiff hair, which is technically known as “kemp”—a subject that will be discussed in another paragraph. It is held by some writers that this short hair does not occur on the pure Angora, and that where it does appear it is upon Angoras that have been bred up by crossing upon the common goats; in short, that it is a relic of the common goat. This argument seems plausible, at least, for two reasons: First, there is no certainty that any Angora goats now in existence are absolutely purebred, as many years ago the Turkish breeders began the practice of crossing upon the Kurd goats, and thus vitiating the blood; second, it is noticeable in building up a flock by crossing upon the common goats that the short hair is very prominent in the first cross, and gradually grows less as the crosses become higher.

The uses of mohair in manufactures are discussed on page 44 and need not be repeated here. The properties of this fiber which render it desirable are length, fineness, luster, strength, elasticity, and specific gravity, and these are relatively desirable in about the order given. There is no difficulty in securing length and strength, but the other properties must come by the most painstaking care by breeding. Having length, strength, and luster, the manufacturer wants the fiber as fine as can be bred. Good mohair averages about one five-thousandth of an inch in diameter; or, expressed otherwise, 5,000 hairs may be laid side by side in solid contact within the space of 1 inch.

Many mohair growers assert that the quality of the fiber depends largely upon the climate and the feed; and all are agreed that the fiber becomes coarser as the animal grows older. Schreiner says:

If goats are to produce the best fleeces they are capable of, they must be maintained in uninterrupted good condition. They must have a variety of food, principally shrubs and aromatic plants, and lead an active life; they must, if possible, have running water to drink and be kept free from dust; they must not be kraaled (or shedded) except when absolutely necessary; they must have clean sleeping places and must not be crowded together.



The wide range of prices of mohair in the market is due to various causes, but to none so much as the unevenness in quality of fibers. As compared to the total production in the United States, the quantity of first-class mohair is exceedingly small. The tendency has been to breed for length of fleece and size of animal. While both these qualities are desirable, it ought to be plain to anyone that profit does not lie in these directions wholly.

Mohair in a general sense is an expansive term, covering the fleeces of goats of various Angora crosses. The fleece from a cross between an Angora buck and the common "nannie," although scant, coarse, and of uneven length, is unfortunately called mohair, just the same as that from the best animal. The fleece of the second cross is better, and that of the fourth and fifth crosses very good, provided, always, that first-class bucks have been used. The complaint of the manufacturers is that very little first-class mohair is produced in the United States. It has been demonstrated, however, that a first-class fiber can be produced here. Mr. Meeker, late consul at Bradford, England, the leading mohair market of the world, recently wrote as follows:

There has been on exhibition at this consulate for the past week an American-grown mohair fleece forwarded to Bradford by Mr. C. P. Bailey, of San Jose, Cal. The fleece is that of a 2-year-old graded doe and is understood to have been grown on Mr. Bailey's ranch in Nevada. The quality of the hair has been the wonder of all who have seen it. It has been closely examined by several of the leading mohair dealers and importers, all of whom have expressed the highest opinion of it. One of them, Jonas Whitley, ex-mayor of Bradford, said: "I have now in my warehouse about \$200,000 worth of mohair, both Turkey and Cape, and I am entirely sincere when I state that there is not a better fleece in the lot. I will buy all the American mohair like that that may be offered me at the market price. Should it uniformly equal this fleece, I do not know but what I would pay more than the market price. \* \* \* I unhesitatingly say that the sample fleece is as good mohair as is grown."

A well-known spinner of New England is quoted by Mr. Bailey as saying that—

The American mohair is better than any brought from abroad; it is smoother, makes a smoother thread, and runs spindles faster; it is silkier and softer, and I can pick out cloth made from it without looking.

Mr. G. A. Hoerle says:

Samples of our best mohair which were sent to England were classed as equal to the best Turkish, while the best Cape hair was as much as 2 or 3 cents lower, a fact which proves that even if we finally should have to ship mohair to Europe it would, in the long run, pay as well as selling at home.

Those American breeders who have been taught to believe that the mohair of the Cape of Good Hope is so much better than that produced here will find encouragement in the following from Mr. S. B. Hollings, writing to the *Midland News*, Bradford, England, under date of April 27, 1900:

When I state that the vast majority of mohair clips produced in Cape Colony does not fill the bill of our manufacturers I state the whole and sole reason why Turkish

sorts have been called upon very extensively in preference to that grown in South Africa. \* \* \* I am stating a plain fact that Bradford users do not think that the Cape clip is as yet within 25 per cent of the general excellence of that grown in Asia Minor, and that much remains to be done before users here will avail themselves of that produced in Cape Colony in preference to that grown in Turkey.

The encouragement is not in the fact that the Cape mohair is so much poorer than the Turkish product, but because ours is no worse than that of the Cape. Although the annual product of the Cape of Good Hope is about 12,000,000 pounds and ours only 1,000,000 pounds approximately, the growers there recognize the importance of the American industry. Mr. W. Hammond Tooke, after discussing the Australian possibilities in this industry, says "the United States of America should give us more concern." In the same article, published in the *Agricultural Journal of the Cape* (May 25, 1899), he states that the breeding of goats here for mohair is no longer considered an experiment, and that the mohair is "much like a large part of that produced in the Cape, consisting of rather low grades, short and crossbred, and only suitable for combination yarns and for mixing with Turkey hair."

As illustrative of the superior value of the mohair from Angora vilayet and Cape of Good Hope, the following table and statement are copied from Schreiner's work (p. 44). The figures represent the average of the four years 1891 to 1894:

	Angora.	Cape.
Mohair goats.....number..	1, 230, 000	2, 891, 233
Mohair.....pounds..	3, 360, 000	9, 982, 709
Per goat.....pound..	2½	a 3½
Total value of mohair.....pounds sterling..	200, 000	419, 501
Per pound.....	1s. 2½d.	a 10½d.
Money yield of mohair per goat.....	3s. 3½d.	2s. 11½d.

a Nearly.

The superiority of the Turkish hair is at once apparent, there being a difference in its favor in the above figures of nearly 4d. per pound, and also a difference in its favor in the net return per goat of nearly 4d., although the Turkish goats shear three-fourths of a pound of mohair less per goat than the Cape goats.

Mr. George B. Goodall, of the Sanford Mills, Sanford, Me., points out, in a recent letter to the Bureau, the defects of the American-grown mohair taken as a whole. His mills consume more than a million pounds of mohair annually, some being the domestic product and some the Turkey product, and thus he speaks from large experience. He says:

Before the domestic mohair growers can expect to get anywhere near Turkey prices they must do away with kemp and aim for a fine stapled hair instead of breeding for coarse, heavy fleeces, as many do. The coarser the fiber, the lower the value to the spinner. We often get small shipments of domestic fleeces as choice and fine as

those grown in Turkey, which goes to show what can be accomplished with care and brains. The trouble is more with the grower than with the goats and the climate, for what one man can do another can do.

There are in these quotations hints enough to point the proper course for those goat raisers who desire to make their mohair crop a paying one. If an Angora goat is of most profit in clearing land of brush (as is the case in some localities), his work will be done just as well if he produces at the same time a first-class fleece; thus he may become more valuable. There is no reason why Angoras should have the preference for such work over the common goats, except that they may be profitable in other respects at the same time; therefore the better the fleece produced while destroying brush, the greater the value of the goats.

*Influence of age and blood on fiber.*—Reference has already been made to the fact that the fiber becomes coarser as the animal grows older. The fiber is also coarse upon younger animals of the lower crosses. The best fiber grows upon the animals of best blood; and among these that upon kids, yearling wethers, and does, in the order named, is preferred. The best fiber is usually very curly, in ringlets rather, but not kinky. It loses its curl and becomes thinner on the goat, coarser, and straighter as the animal grows older. A fiber of best quality is shown on the left of Plate V. It will be noticed by careful examination of this illustration that the samples become less curly as arranged from left to right. The reason for this is that the samples are coarser toward the right. The last sample in the illustration is from an old buck, the one next to it from an old doe, while the two samples on the left are from kids.

*The weight and length of fleece.*—The weight of the fleece is always a subject of inquiry and is a difficult question to answer, because of the controlling circumstances—such as climate, feed, care, and, above all, the degree of Angora blood in the animal. The briefest answer, and probably the best one that can be made in a general way, is that of Mr. C. P. Bailey, and is as follows:

Half-breed goats scarcely shear enough to pay for the shearing; three-fourths bred goats shear 1 to 1½ pounds, worth 15 to 20 cents; seven-eighths bred goats shear 2 to 3 pounds, worth 20 to 30 cents; fifteen-sixteenths bred goats shear 3 to 5 pounds, worth 30 to 40 cents.

He adds the important statement that the fourth cross, or fifteen-sixteenths, is the lowest grade that he would use exclusively for mohair.

It would be a difficult matter to state what is the average length of an annual fleece, but 10 inches would probably not be much out of the way. There is on record an account of mohair measuring 20 inches. Mr. U. S. Grant, of Oregon, reports a buck with a fleece 19 inches long. In the southern part of the country, where shearing is done twice a year, the fiber must necessarily be shorter. This is a disad-

vantage, as the spinners prefer a long fiber. Schreiner shows (p. 119) a picture of a buck carrying a 13-months' fleece, weighing 16 pounds, which touches the ground. The feet of the animal are just visible.

The weights of the fleeces in the United States are much greater than in Turkey and about the same as in the Cape of Good Hope. With reference to Turkey, Schreiner says: "It would seem that 14 pounds for rams and 8½ pounds for ewes are about the maximum weights of really first-class fleeces, and that if these weights are much exceeded the quality of the hair is inferior and a good deal of the weight is due to oil and dirt." In the Cape of Good Hope buck fleeces have surpassed 15 pounds and ewe fleeces 11 pounds. Information at hand indicates that the average weights of fleeces in Oregon exceed those of other sections of the country, especially in the warmer portions. This reminds one of the opinion of Colonel Black, that the fleece will be increased 1 pound in weight by moving the goats to the colder Northern States.

Schreiner says that the goats must not be crowded together in quarters if the best fiber is to be obtained, and Hoerle says that "goats running together in small herds will shear from 25 to 40 per cent more than when running in large herds." The size of flocks is discussed in another place (see p. 75).

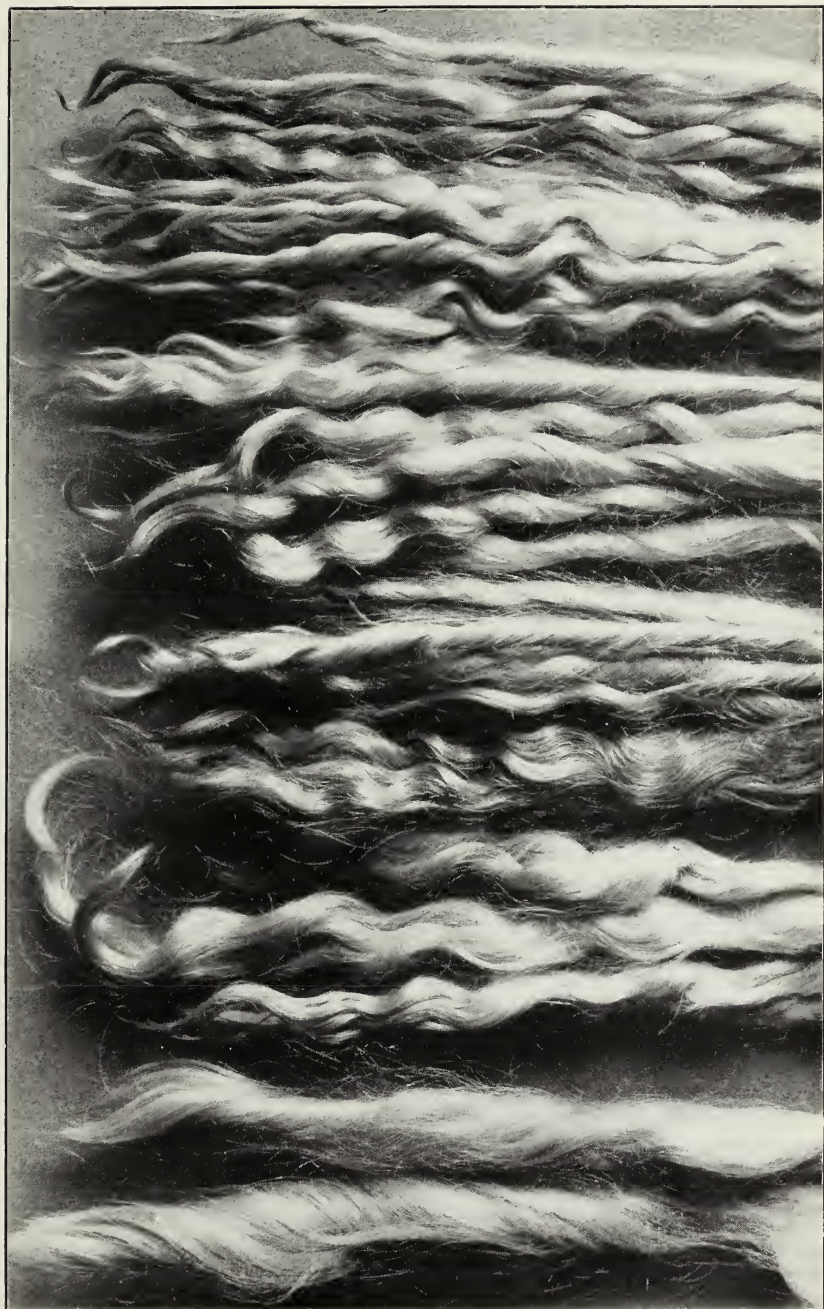
The influence of semiannual shearing upon weight of fleece is also discussed elsewhere (see p. 76).

*Kemp*.—The term "kemp" used in connection with mohair refers, in a collective sense, to the coarse hair of the goats, and is especially noticeable in the lower grades. Hoerle says: "Kemp is the coarse, dead-looking hair all through the mohair, about 2 to 4 inches long, which I consider to be the degenerated remnants of the long, coarse, dead-looking outer coat of some common goats. It is usually thickest on the hind quarters of badly bred goats." Its presence in mohair always reduces the price in proportion to the amount that is present. The reasons for this are various—the hair is coarser than the mohair; it is lusterless; it is of various short lengths and must be removed, in doing which there is a heavy loss of mohair; and it will not, except to a limited degree, take the dyes used for mohair. This last statement is a striking fact and ought to be the means of prompting the mohair growers to strive to breed it out. Whether or not it can be done entirely is an open question, but it is believed by many prominent breeders that it can be done. Schreiner, however, considers kemp a part of the fleece that can not be eradicated completely.

C. P. Bailey & Sons Company say:

Kemp is a coarse white hair which grows from a separate root sheath between the mohair and is usually thickest upon low-grade goats. It is most noticeable along the backbone and around the tail and upon the thighs. We have never seen a goat entirely free from kemp, nor have we ever seen mohair from any part of the world

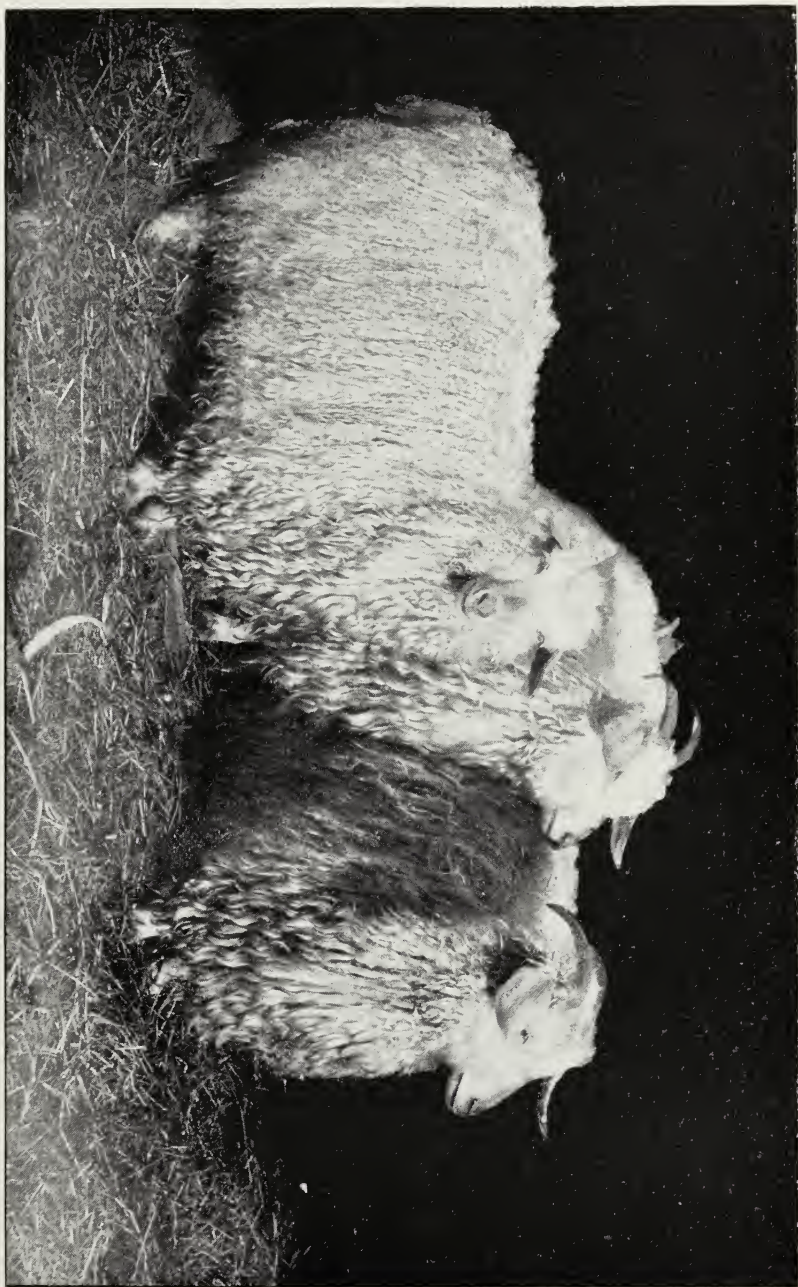




SAMPLES OF MOHAIR.

(Photograph furnished by Harris & Baylor, Montell, Tex.)





DOES, TWENTY-ONE MONTHS OLD. FLEECE OF NINE MONTHS' GROWTH.

(Photograph furnished by Dr. J. R. Standley, Plattville, Iowa.)





that was entirely free from it. Kemp may be best detected by separating the mohair upon the thigh of the animal and closely inspecting the roots of the hair. It will be seen as short, coarse, lusterless fibers closely intermingled with the long, silky mohair.

After the mohair sorter has done his work with a fleece the fiber is scoured, dried, and straightened, and then put upon a combing machine. This machine separates all fibers, whether of kemp or mohair, of 4 inches in length and under. Kemp of a greater length than 4 inches remains with the longer mohair. If there is much of this long kemp after the first combing, the fiber passes through a second combing, the machine being set to throw out the kemp and mohair of greater length.

The residue of these two combings, being a mixture of kemp and short mohair, is called noilage. The first lot of noils is about 2 inches long and the second 4 or more inches long. The length of the second noils will vary with different grades of mohair, depending upon the length of the kemp present.

Some mohair will shrink 40 per cent in weight in the first combing and 15 per cent in the second. The mohair thus combed is used in the fabrication of plushes and fine dress goods, while the noils go into the manufacture of carpets, blankets, hats, etc.

In a recent article in the Oregon Agriculturist, Mr. George B. Goodall says:

A majority of the mohair growers in this country little realize how much kemp has to do in keeping down values of their clips. If they could spend a few hours in our sorting and combing rooms the lesson learned would be of great value to them—more than could be obtained by reading. In watching the combs at work they would notice some making 5, 10, or 12 per cent of noil or waste, while others will be taking out 30 or 40 per cent. Ask the comber the reason of this and he will reply that one lot has a much larger amount of kemp than the other. One fiber of kemp takes out five or six good fibers which should go into yarn. It may not generally be known why kemp is such an objection, but when we state that it will not take color, but remains nearly white in the goods after passing through the dye bath, you will understand why I write so strongly on this point. If you want to form some idea of how a fabric looks made from kempy mohair yarn, just look at a man's hair that has commenced to turn gray, especially dark or black hair.

Through the kindness of Mr. Goodall the Bureau of Animal Industry has received some samples of low-grade plushes for car seats which show the effects of kemp in mohair. Although in this case dyes were used which acted to some extent upon the kemp, the coarse, dull-colored hairs are easily seen. An effort was made to photograph the samples for reproduction in this paper, but it was impossible to bring out the details sufficient to show the kemp, although it was plainly visible, under certain lights, in the plushes.

The following is taken from Mr. E. H. Jobson's *Angora Goat Raising*:

In the first crossing of goats the kemp hair will be paramount in appearance with the mohair and will be very coarse, and as the animal becomes better graded the shorter the kemp will be, and it also generally becomes of a finer fiber as the pure

blood is infused. Upon examining the best grade of goats that we have we find that the kemp is very short, probably only three-fourths of an inch in length, and the mohair on one of these goats is 8 inches long and weighs 5 pounds, while the kemp on the second goat is just as scarce and of the same length; also the mohair is of the same length, but the weight is fully 2 pounds more than it was on the first goat: herein lies the difficulty. Both goats have the same appearance so far as examination can determine, but the second goat is inferior to the first because the fiber of his hair is much coarser than the other and contains more of the kempy blood; hence the difficulty in examination appears in the quality of the fiber, which can be detected only by an experienced eye.

The kemp hair will always be known by its being shorter and very coarse and of a chalky-white appearance. It is particularly noticeable on account of its having no luster, which is characteristic of all mohair. The first place that kemp becomes extinct on a goat is on shoulders and neck—i. e., on the sides and along the ribs—and the last place for it to become extinct is along the top of the neck, down the backbone, and on down to the hocks, the hocks being generally the final place for the disappearance of the coarse hair; also you will find kemp to predominate on the belly. Do not understand me to say that the kemp becomes entirely extinct, for it does not, but it is covered up with the mohair and can be seen only by throwing the animal down and examining him carefully, and if he is apparently free from kemp you can examine him on the places above mentioned and you will invariably find more or less kemp, and generally you will find considerable all over the body. A good way to examine the hair is to pull out a small lock and spread it out in the hand, and you can readily discern any coarse hairs that may be in it. It is supposed by the best authorities we have that there are no goats in the world that are absolutely free from kemp, although it is confidently expected by many of the prominent breeders that it is only a question of a few years more of careful breeding until we have a kempless goat.

In addition to the above, Mr. Jobson writes to the Bureau his opinion that there have not yet been produced any goats absolutely free from kemp, but he believes that the intelligence of the Americans will enable them to produce such goats, and he himself proposes to devote several years to the effort. He proposes to begin this work upon the assumption that there is nowhere an absolutely pure Angora goat—that there is at present in all of them in some degree the blood of the common breed.

The discussion of kemp will close with quotations of the opinions of correspondents of the Bureau who have had experience in raising Angoras. It may be stated that a large majority of these men hold that kemp never disappears entirely. The quotations follow:

I don't think that there are 500 Angoras in the United States, thoroughbreds or crossbreds, that are entirely free from kemp. Judging, however, from what I have seen in former years, freedom from kemp can exist, even with second and third crosses, provided the right kind of common does are mated with really kempless  
 • bucks. Such experiments were made with bucks of the Price Maurice importations to Australia, of which one buck and two does came to Texas. Mr. Schreiner, the Cape Colony authority, says that none of the pure bloods (so called) imported into Cape Colony from Turkey were free from kemp, and, further, "that kemp can and will be entirely eliminated from our [Cape Colony] best stud goats of our most intelligent breeders I have no doubt whatever," with which opinion I fully agree.—*G. A. Hoerle.*

In all crosses it will still remain, to some extent at least, on some parts of the body; for instance, on the belly.—*H. T. Fuchs.*

It will never disappear.—*Harris & Baylor.*

If only the pure-blooded Angoras are used as sires, kemp will be imperceptible in about six or eight generations.—*Col. William L. Black.*

There is but little in the very best.—*Abe Blackburn.*

There is not much after the first cross.—*Oscar Tom.*

In the fourth cross it nearly disappears, but never entirely.—*C. P. Bailey.*

I can not find kemp in my thoroughbreds, although I have found it in billies that I bought for pure. I think it can be bred out with proper care in selection of billies.—*George A. Houck.*

*Other deleterious features.*—The very short hair, mane, kemp, and the hair that has been cut twice in shearing are, together, called noils, and this must all be combed out before the mohair can be spun. The noilage in Turkish mohair is only 15 to 20 per cent. In our domestic product it runs as high as 40 per cent. Noils are worth only 14 to 16 cents a pound, the same as short wool for blankets.

In some sections of our country, where the climate is dry and the soil distinctly alkaline, the natural animal yolk disappears from the mohair, leaving it dry, frowsy, and harsh. The dust of the fine alkali soil penetrates the fleece, so that much of the mohair grown in those sections is loaded with it, amounting in some instances to 40 per cent in weight.

*Markets and factories.*—Two of the questions which the mohair producers were asked to answer were: "Do you have any difficulty in disposing of your mohair?" and "Where do you market your mohair?" The answers to the first question were all firmly in the negative except in one instance, where an Arizona producer replied: "I have no difficulty in disposing of my good mohair, but my short and kempy stock goes slow and at a low price (23 cents)." There is much encouragement in these replies to those who may fear that the markets may not demand the supply. The ingenuity of the manufacturers in working the better grades into woolen fabrics and the poorer grades into plushes which make good car seats, horse blankets, hats, etc., has, no doubt, opened the way for the consumption of all that may be produced.

As to factories, there are more than a sufficient number in this country to manufacture the product; in fact, many of them do not attempt to use mohair for the reason that the supply is so limited. These factories of the United States are all in the East, and the principal market for the mohair is New York. The marketing center of the world is Bradford, England, where practically all the product of Cape of Good Hope and Turkey is sold.

Very few of the mills will purchase direct from the producer. They

find it preferable to buy from the commission merchant, as he separates and classifies the fleeces, and the purchaser is enabled to make personal inspection. A few producers ship their mohair to Boston, and others, especially some of those in the Northwest, sell to commission men in Portland, while others of the West sell in San Jose, Cal.

*Production.*—The production of mohair will be considered elsewhere (see p. 82) in connection with the world's production and the imports and exports.

#### MANUFACTURES OF MOHAIR.

One of the reasons why the mohair industry has lagged so in this country during the fifty years since the introduction of Angora goats is that the use of mohair goods was subject to the caprices of fashion. It would not be strictly correct to say that the industry has even got beyond the influence of fashion, but it is at least nearly so. There is now a steady demand for the product of our country, and much is imported besides. Dame Fashion is still whimsical toward all-mohair goods, especially dress goods, but the mohair is mixed with other fibers for producing fabrics of strength and luster, and the home supply is not nearly equal to the demand. Because of the limited and uncertain supply, some mills which have at times used mohair no longer attempt to secure it. They are prepared to use it as soon as the supply will warrant the undertaking.

Mr. George E. Goodall, president of the Sanford Mills, Sanford, Me., who has kindly furnished the Bureau with valuable information, states that his mills consumed 840,000 pounds of domestic mohair and 460,000 pounds of Turkish mohair in 1899, a total amount of 1,300,000 pounds. While these mills are believed to be the largest consumers of the domestic product, there are thousands of pounds consumed by other mills (see p. 82). This proves, first, that there is a good demand for mohair, and second, that the usual estimate of the domestic production in 1899 as being between 600,000 and 800,000 pounds is far below the real amount.

Only a small percentage of the domestic product of mohair is of superior quality, as has been shown in previous pages. The greater amount is of inferior quality from various causes: First, the fleece from the crosses, beginning with the first cross, is called mohair, and is indeed worth something; second, all of the crosses up to the fourth or fifth have a great deal of kemp in the fleece (it never disappears entirely from any cross); third, efforts have been directed too persistently toward producing a large fine-looking animal, the fleece being a secondary consideration; fourth, the staple, when of superior quality, is often too short.

Many grades of mohair are mixed with silk and wool in a large variety of fabrics in which it formerly was not used. It is made into



dress goods known as mohair, and much of what is usually called alpaca is nothing less than mohair. The fine fabric called camel's-hair goods is also of the best mohair, and not from the camel, as we would suppose from its name. "Chamal" is the Arabic word for camel, and the Arabs called the Angora goat the chamal. Mohair braids contest the markets with silk braids and are never out of fashion. The ways in which it is used with silk and wool are numerous. It adds to these fibers not only its brilliant inherent luster, but great durability as well. The growers of mohair are fond of quoting Dr. Davis, who stated in the Agricultural Report for 1853 that "I have socks [of mohair] which I have worn for six years and are yet perfectly sound." He is also quoted as saying that while in Asia he saw wrappers of mohair used by the natives which, they assured him, had descended from sire to son for three generations.

Mr. William R. Payne, an authority, is quoted below on the uses of mohair:

The most important product of the Angora is the long, silky, wavy fleece, used either pure or in connection with wool, silk, linen, or "carlton" in a variety of fabrics for house furnishings and ladies' goods, brilliantines, linings, braid, plushes, astrakhan cloth, furniture coverings, curtain material, knit goods, fancy effects in shawls and dress goods, and numerous other textiles. \* \* \* The short, low, and crossbred hair is used for blankets, lap robes, rugs, carpets, and low goods generally, but even then is worth more per pound than most sheep wool, varying from 10 to 21 cents per pound. The uses for mohair are increasing every year, and new outlets are being found for it as manufacturers are advancing in the variety of their products.

#### THE MEAT AND THE MARKETS.

*The meat.*—In building up a flock of Angoras from common goats (a subject which is discussed elsewhere) the males must not be permitted to grow into bucks of breeding age; and even among the high grades there are comparatively few bucks that should be retained as such for breeding purposes. They should be castrated early. The great majority of these wethers, especially if they are of the first or second cross, do not produce sufficient mohair of good quality to warrant flock raisers in keeping them. These should be converted into meat as soon as large enough. Those wethers and does which produce a fair quality of mohair may be retained for that purpose for a few years and then killed for meat. They are not, however, so good for this purpose as the younger animals.

There is a deep-seated prejudice, as has already been stated, against the use of goats of any kind for meat. This is founded upon ignorance rather than experience. The most ill-smelling "billy" of the worst possible type is by many made the standard of goat meat for the whole of the goat family. As far back as Abraham's day we read of goats being used for meat (very likely Angoras), and this, too, when

there were many cattle and sheep. Certainly no prejudice existed against them at that time.

There is not much to be said about the meat of the common goat. It is not so generally used as that of Angoras. The flesh of their kids is considered very fine, and in some sections of the country goats of all ages are killed for meat. There are comparatively few common goats in the United States, and no attempt is being made to put them upon the market. The current report that goats are sold to the packers in the large cities for canning purposes is true in the main, but refers to the Angora grades. The discussion of this question in this paper deals with the Angoras of all grades.

The flesh of the Angora is exceedingly nutritious and palatable. Shropshire lambs, which are considered as among the best kinds of meat, are said not to be superior to a well-fed and well-cooked kid. In the Southwest these animals are as readily sold for meat as sheep, and the market has never been overstocked. A gentleman in Texas found a ready market for his canned Angora mutton, but was compelled to close his cannery because the supply of goats was not nearly sufficient to supply the demand. In the Northwest the principal use of the Angora is for clearing bushy land, and consequently they are not so extensively used as food. However, in nearly every locality there some have been killed for mutton, and there has never been a derogatory statement concerning its quality, so far as the writer is able to learn.

In Cape Colony it is said that the old does are slaughtered to furnish meat for farm hands and young wethers are sold to butchers in the town. In California many miners purchase Angora wethers in preference to sheep wethers for salting down for winter use, because, as they state, the Angora contains less fat, is more easily kept, and is just as palatable.

Mr. John L. Hayes, in the *Overland* (1870), said that, in order to test the qualities of Angora and sheep mutton, a dinner was to be prepared with the two kinds of meat, and that the guests were not to be informed as to which was sheep and which was goat, but they were to decide upon the merits of the dishes.

Twelve disinterested men were invited to partake of the dinner and express their opinions of the various dishes they had eaten. Four decided in favor of the sheep's and eight in favor of the goat's flesh; and since that breeders in Monterey County have no difficulty in selling their goats to the neighboring butchers for the same price paid for the best mutton.

Mr. E. H. Jobson, of Lake Valley, N. Mex., is authority for the statement that the wealthy people of St. Louis recently began eating young Angora mutton and that it is now a regular portion of their fare.

One of the questions to which the Bureau sought replies is as follows: "In your opinion, what are the relative values of Angora flesh and mutton?" Several answers to this question, with other quotations upon the same subject, are given herewith:

As a food there is no meat that is purer or more tender. It is better than mutton, as there is not that excessive fat to contend with that is found on sheep. This is a good feature in the Angora venison. In their feeding habits they are very similar to a deer, which alone is sufficient proof of the merits of their food qualities. A young kid is as dainty a morsel as can be found in the meat line. The wealthy people of St. Louis recently took up the fad of eating young Angora venison, and, as a result, it is now a regular portion of their fare; and that fad had done a great deal toward obviating the prejudice which has so long existed against the Angora venison as a food. Angora mutton is now being sold on the market at a fraction of a cent less than sheep mutton.—*E. H. Jobson, Lake Valley, N. Mex.*

If Angoras are castrated or spayed when early kids, and properly fed before marketing, and if this is not done too far away from the slaughterhouses, certainly not more than a two-days' ride (road travel), their meat is fully as juicy as Southdown mutton, while, on the other hand, it is never greasy. This is not only my experience in Texas, but was also that of Mrs. Sarah K. Barmore, of Rockland County, N. Y., who kept a flock of grade Angoras and sold the progeny to her neighbors, principally summer residents from New York City. She emphasized the point that her customers preferred it to ordinary mutton, because it was not greasy. Feed Angoras as much as you choose, they will never lay on fat in thick layers all through the meat, as in the case of other domestic animals. They gain, rather, like deer, in meat principally, which has a slight venison flavor.—*Gustav A. Hoerle, Ridgewood, N. J.*

It is a curious fact, but true, that black-haired animals have darker skins and darker meat than white-haired animals. This accounts for that whiter appearance of the Angora goat flesh, which enables the dealer to market it as mutton. The black hair, from a poetic standpoint, casts its perpetual shadow on the viand and leaves it shaded. The goat flesh is a pleasant and healthy meat. It should be so, since the goat is an eater of clean food, and is possibly the freest from disease of any quadruped.—*Queensland Agricultural Journal, May, 1900.*

The flesh of the Angora goat is said to be superior in flavor to that of any mutton. We have eaten several half-bloods and found them delicious. Some of the meat was put on sale in a local meat market, and the purchasers came back a few days later and wanted more good mutton like that they got the last time. This, we think, is a strong recommendation. The meat is juicy and sweet and has a game flavor.—*Miller & Sibley, Venango County, Pa.*

The Angora is much more nutritious than sheep mutton, especially where the meat is grown on underbrush (leaves), as the following compilation of relative values of feed will show:

Character of feed.	Protein.	Starch, etc.	Fats.
	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>
Good pasture grass .....	3.5	9.7	0.8
Rich pasture .....	4.5	10.1	1.0
Leaves of trees .....	5.2	15.2	1.5
Red clover .....	3.3	7.0	0.7

It is often prescribed by physicians for invalids and children for this reason. The meat is excellent, and not distinguishable from mutton of the same age and condition. It is largely sold as such in many of the larger markets, being regarded as a staple in the districts where it is raised.—*W. G. Hughes & Co., Hastings, Tex.*

It is the universal testimony of those who are familiar with Angora goats that the flesh of this animal is far superior to that of the common goat. The Angora is quite as valuable for its flesh as for its fleece.—*Oregon Agriculturist, Portland, Oreg.*

The meat from Angora goats is fully as good as the most juicy mutton. This meat is sought now more than at any previous time.—*Kansas City Drovers' Telegram.*

Anybody who has ever tasted a roasted or barbecued piece of Angora mutton will find it is better than any meat they ever tasted. Angora mutton is worth in the markets about the same as sheep mutton. I sell it to my neighbors at 4½ cents per pound, and in town I sell it at 5 and 6 cents per pound.—*H. T. Fuchs, Tiger Mills, Tex.*

It is better than mutton, being free from the oily taste of sheep meat and partaking somewhat of the flavor of wild meat.—*George A. Houck, Eugene, Oreg.*

Angora mutton is far superior to that of sheep and brings just as much on the market. Being free from disease, why not?—*Josephus R. Barnette, Globe, Ariz.*

Superior, as they live principally upon leaves and weeds, which gives to the meat a game flavor.—*W. T. McIntire, Kansas City, Mo.*

It takes an expert to tell the difference; and, if there is a difference, it is in favor of the Angora.—*Harris & Baylor, Montell, Tex.*

I believe it is superior in that it is absolutely pure, with no superfluous fat, and is as tender as the finest of venison.—*E. H. Jobson, Lake Valley, N. Mex.*

I prefer the Angora or common goat flesh to that of sheep, though I have seen many people who could not tell the difference.—*H. I. Kimball, Maxwell City, N. Mex.*

I consider one as good as the other.—*Abe Blackburn, North Yamhill, Oreg.*

Young goats are fine meat, but old wethers are tough and strong, although good when boiled tender and served cold.—*Oscar Tom, Angora, Oreg.*

The young wethers make the best of mutton. The meat is rich and juicy and free from the strong taste so common to the meat of the common goat. I consider it equal to mutton. We have sold hundreds of head for mutton, always reserving the skins, which are worth green from 75 cents to \$2 each.—*C. P. Bailey, San Jose, Cal.*

I think one is equally as good as the other.—*A. T. Waln, Salem, Oreg.*

Angora is very much the best.—*U. S. Grant, Dallas, Oreg.*

It takes an expert to tell the difference, or to tell Angora mutton from venison where the goat had access to brush.—*Cook & Buck, Oskaloosa, Kans.*

I value Angora mutton 50 per cent above sheep mutton.—*V. Cladek, Larwood, Oreg.*

Angora flesh is worth 12 per cent more than mutton.—*Richardson Bros., Dubuque, Iowa.*

It is preferable to mutton, as it does not have the woolly flavor so objectionable to many people. During the browsing season the meat has a venison flavor, but this is lost when corn is fed in the feed lot.—*R. C. Johnston, Lawrence, Kans.*

I am sorry we have no regular market for goat meat. It is as fine as venison when killed in condition and properly cooked.—*W. Brown, Salem, Oreg.*

Local butchers will pay 10 cents per pound for the carcass dressed, the seller retaining the pelt, which brings \$2.—*I. McGovern, Libby, Mont.*





FIG. 1.—ANGORA BUCK "PASHA."

(Photograph furnished by C. P. Bailey & Sons Company, San Jose, Cal.)



FIG. 2.—A YEARLING ANGORA IN CAPE COLONY.

(From the American Sheep Breeder.)





Fleece, 9 pounds

Fleece, 5  $\frac{1}{2}$  pounds.

Fleece, 6 pounds.

**ANGORAS, SHOWING FLEECES OF SEVEN MONTHS' GROWTH.**

(Photograph furnished by Harris & Baylor, Montell, Tex.)







*The markets.*—One of the first questions to be considered by a man who is about to embark in stock raising of any kind is the markets for his surplus. This question is first because it is the principal one and all important. The one who proposes to begin with a flock of thoroughbred or high-grade Angoras, such as will yield merchantable mohair, will not need to consider markets, as the increase will be employed to produce mohair; but a large number of flocks will be built up in the future, as they have been in the past, by the use of does of the common breed. This method will necessitate getting rid of every wether for two or three years. All does, of course, are kept for breeding with purebred bucks. It will be ascertained that the fleece of low grades is barely worth the cost of clipping it; that the skin is not so valuable for leather as that of the common goat; and that, as a rug or robe, the pelts are not so valuable as those of the higher grades. Therefore, if there is to be any profit from this part of a flock, there must be a market for the meat.

So many questions concerning this phase of the industry have come to the Bureau of Animal Industry that, in collecting data for this paper, it was decided to go beyond the newspaper accounts and ascertain the facts from the actual producers themselves. The question submitted was, "Do you have any difficulty in disposing of your surplus Angoras for meat?" The answers have been invariably in the negative. It should be said, however, that in the Northwest very few are used for meat. They are considered more valuable there as brush destroyers. The conditions obtaining there are not found in all localities where Angoras are raised. In many places Angoras will be kept where, instead of permitting them to destroy the brush utterly, efforts will be made to preserve brush pasture for them; in the Southwest they are not all required for destroying brush, and thousands must be sent to market.

The reason why goats are not seen oftener in the market reports of receipts and shipments is that they pass as sheep. It is stated, however, that increasing numbers are seen in the larger markets. In the Union Stock Yards of Chicago as many as 8,000 were received in one week last year.

While the goats pass as sheep, they are also sold to consumers as sheep. They have not yet brought as good prices as sheep, and it can not be hoped that they will do so until there is the same demand for their mutton, which will come as soon as the prejudice against goats disappears. The difference is very slight in some places. In Kansas City, for instance, the sheep bring about one-half a cent per pound more than goats. The packers buy them as goats and sell them as sheep in the form of dressed meat or canned.

Some of the answers to the question submitted by the Bureau are appended:

You ask if I have any difficulty in disposing of goats for meat. None at all. The packers here buy goats as goats and sell them as sheep. They make a difference of about half a cent a pound in favor of sheep when buying, and, as they never sell goats, they save that difference in selling.—*Thomas H. Mastin, Kansas City, Mo.*

None whatever.—*W. G. Hughes & Co., Hastings, Tex.*

Angoras bring now in Kansas City and Chicago within 4 or 5 per cent of the price of ranch sheep, while ten or twelve years ago not half that much could be obtained. Were it not for their unpopular name "goat," the meat would bring by far the highest prices in the retail markets—provided, of course, that they reach the market in proper condition.—*G. A. Hoerle, Ridgewood, N. J.*

I sell readily at the four large markets within 25 to 40 cents per hundredweight of the same grade of sheep. They are purchased by the packers. They dress out more meat than sheep.—*R. C. Johnston, Lawrence, Kans.*

We do not have to dispose of them for meat, as there are parties always anxious to buy. We would have no trouble to dispose of them for meat if we wanted to.—*Richardson Bros., Dubuque, Iowa.*

We do not. It usually sells for a little less than mutton.—*C. P. Bailey, San Jose, Cal.*

There is no sale here for goat meat. Wethers are generally used for their mohair or clearing land of brush.—*Oscar Tom, Angora, Oreg.*

There is not much use being made of them except for clearing land. A few are occasionally slaughtered here.—*Abe Blackburn, North Yamhill, Oreg.*

The demand for mutton goats is greater than the supply. We get good values for the mutton.—*E. H. Jobson, Lake Valley, N. Mex.*

They sell as readily as sheep, but bring from 25 to 50 cents per hundredweight less on the market.—*W. T. McIntire, Kansas City, Mo.*

None sold for meat here.—*V. Cladek, Larwood, Oreg.*

So far all goats are wanted for clearing brush land, and there is no trouble in selling them.—*W. Brown, Salem, Oreg.*

We have a local market which can use three times as much as we produce.—*Josephus R. Barnette, Globe, Ariz.*

Never had a surplus yet, being in demand at fair prices for clearing land.—*George A. Houck, Eugene, Oreg.*

None at all. If fat, the packers will buy them readily. If not, the sheep feeders will buy them for fattening.—*William L. Black, Fort McKavett, Tex.*

Have not. Have used and sold very few for meat, as they are in demand as brush killers.—*J. R. Standley, Platteville, Iowa.*

None at all. I could sell hundreds and thousands as easy as I could sell sheep.—*H. T. Fuchs, Tiger Mills, Tex.*

We do not, but on account of a prejudice against the name "goat," we have to sell at about 50 cents less than sheep bring.—*Conklin Bros., Newville, Cal.*

#### THE MILK.

The Angora is not primarily a milch goat, and is not often employed for that purpose. The information at hand indicates that the quantity of milk given by an Angora doe is uncertain, and only in exceptional

cases does the amount approach that given by the established breeds of milch goats, such as the Toggenburg, Malta, and Nubian breeds. Some of the records of the earlier importations of Angoras into the United States show that some of them were milked with success. At this time, however, they are not recommended as milch goats; they are more useful in other lines. It is stated upon the authority of some of the oldest breeders in the country that the likelihood of finding a good milch goat among the Angoras diminishes as the grade of the goat is raised. The milking qualities evidently come from the side of the short-haired goats.

The quality of Angora milk is said to be equal to that of any other breed, and more nearly equal to human milk than that of any other animal. For this reason it is considered the best substitute for mothers' milk for infants. An analysis of goats' milk for the British Goat Society, with an analysis of cows' milk for comparison, is shown in the table below. It should be stated that the cows' milk was from a cow which was a winner at a dairy show.

*Comparison of analyses of goats' milk and cows' milk.*

Element.	Goats' milk.	Cows' milk.
	<i>Per cent.</i>	<i>Per cent.</i>
Water.....	83.21	87.56
Butter fat.....	7.30	3.63
Casein.....	4.18	.....
Milk sugar.....	4.10	8.81
Ash.....	1.21	.....
Total.....	100	100

The milk has an additional value in that the animal is practically immune to tuberculosis. Less than a dozen cases of tuberculosis in goats are recorded.

#### THE SKINS.

The use of Angora skins, other than for robes, rugs, and trimmings as described below, is not very extensive. The skin is of a more delicate constitution than that of the common goat, and so does not make such tough leather. While the skin may be taken as an item of salvage from an animal that has died or been killed for meat, it would not be profitable to raise them for leather alone. If such skins happen to have a good fleece upon them, they will be worth more for robes or rugs, but even then they would not be profitable alone. There must be other sources of profit in addition to the skins. Angora skins are manufactured into morocco for use in binding books, and excellent gloves are made from them which bring from \$1 to \$1.50 per pair.

An impression is widespread, based upon immature consideration, that Angora skins may soon supplant the great number of goatskins

which we now import for leather, but the quality of the skin precludes any such possibility. Upon this point the Oregon Agriculturist says:

It is a natural mistake to suppose that Angora goatskins are worth as much, pound for pound, as common goatskins. We have several times noted the fact that this is not the case. Angora skins, after the mohair has been sheared off, will bring only a little over one-half as much per pound as the skins of the common goat.

The only way to keep at home the greater part of the money now sent abroad to pay for goatskins will be to raise enough common goats in the United States to supply the demand.

Hides should be kept clean and should be dried in the shade; sun-dried hides are worthless. If the skins are to be tanned soon after being removed, they may be salted. If they are not to be tanned soon, they should be dried.

#### ROBES, RUGS, AND TRIMMINGS.

Angora pelts are used quite extensively as carriage robes, and they make up into very handsome ones. There was a time when the buffalo, the wolf, and other wild animals supplied the demand for robes in this country, but the extinction, practically, of the buffalo and the great scarcity of the other animals has forced us to look elsewhere for substitutes. An effort is being made to substitute hides of the Galloway and Polled Angus breeds of cattle, but their high cost will prevent their extensive use.

These conditions have resulted in a greater demand for Angora skins for robes. The skin is sufficiently tough for the purpose, and the fleece is easily dyed any desirable color. This characteristic has enabled unscrupulous dealers to sometimes pass them off on purchasers as the skins of some rare animals. In their natural color, the whiteness and brilliancy of which can not be excelled, the skins of the kids and younger does are made up into robes for baby carriages. There are probably a greater number used for this purpose at the present time than in any other way.

As a general statement it may be said that Angora pelts are worth from \$2 to \$3. The real value depends upon many things—such as the size of the skin, the length of the fleece upon it, and the time of year that it is taken.

As rugs these skins are found in many households, and they are both ornamental and durable. They may be used in their original whiteness, or be dyed any color to suit. Their softness makes them very desirable.

They are extensively used for trimming for children's cloaks and coats. Some first-class skins have brought as high as \$18 apiece for this purpose.

Mr. William R. Payne, of New York City, who has had much experience in handling goatskins, says:



Angora skins properly dressed are used, white or tinted, to manufacture rugs, robes, carriage mats, fur sets for children, trimming for ladies' furs, and also for dusters, horse head tassels, doll hair, and wigs. They are mostly imported raw from Cape of Good Hope and Turkey, and range in value, duty paid, from \$1.50 up to \$3.50 each, undressed. Domestic skins are worth from 50 cents for kids up to \$2 each for large full-fleeced pelts. The low, crossbred, common skins and short pelts not suitable to dress are used by morocco and glove leather manufacturers, and are worth from 15 to 18 cents a pound for large sizes down to 10 and 11 cents for small ones and kids.

#### PROTECTION FOR SHEEP.

The ability and inclination of the buck to fight varmints has made him in many places a valuable acquisition in herds of sheep. It is said that dogs and wolves will not only not attack a grown goat, but will not venture into a herd of sheep where there is a buck goat. Many owners of sheep in this country recognize the value of the goat in this respect, and keep one or more for the purpose of protection for their sheep. This practice is especially desirable in pastures where there is no herder or immediate oversight. If one or two goats are placed when young in a herd of sheep they will remain with them all the time. An extensive breeder of Pennsylvania says: "While goats do not fear dogs, and will even fight, I prefer to keep dogs out. I have seen them drive a dog out of the yard, and oftentimes a single goat will protect a flock of sheep from attacks by dogs." If they are old and not accustomed to being with sheep, they will in all probability keep to themselves, away from the sheep. They may be depended upon to do this certainly if there is quite a number of them. They are more rapid walkers and more inclined to wander than sheep, and so will flock by themselves. Their protection to sheep will thus prove a failure.

It is quite amusing to see the courage of a doe when she protects her young kid from a dog, or hog, or flock of buzzards. Two of my neighbors' dogs got in the habit of killing my kids, and one doe protected her kid quite a while from the two large, vicious dogs until the neighbor caught one of the dogs and gave him a good whipping, when the goat assisted in this work by butting the dog with all her might. You should train the goats to be brave by taking your dogs into the goat pen with you, and, in case the dog refuses to run from a brave goat, scold the dog to make the goat think that she whipped him. If you had a tame wolf trained in that way you could train your goats to fight wolves.—*H. T. Fuchs.*

#### ENRICHMENT OF LAND.

The enrichment of land from the droppings of goats is decidedly noticeable wherever they are kept for a year or more. This factor is of no small importance where goats have been employed to clear the brush from land with the object in view of turning the land into grass pasture. Such land, especially if hilly and rocky, is usually in need of fertilizers of any kind if cropping is to be attempted upon it. The manure of goats and sheep is about equal in value. A California firm has been selling Angora manure for fertilizing fruit trees

and lawns for several years. They get \$6 a ton (delivered) for it in carload lots. Manure is considered as one of the resources in the best system of modern farming, and it should be taken into account by anyone who is keeping goats or contemplating doing so.

#### THEIR USE AS PETS.

The purebred Angoras are very graceful, and their beautifully shaped bodies and fine silky hair make them very attractive. There is no animal, except possibly the horse, that is more beautiful than these goats, and no animal is more cleanly in his habits. As pets for children they are very popular, if they can be kept where they will be harmless to vegetation and anything made of cloth. They have all the propensities of the common goat for destroying fruit trees and chewing any kind of cloth and of climbing upon roofs. All kinds of goats are mischievous in the extreme. The Angoras are tractable and are often harnessed to carts, as are common goats, and their beauty makes them more desirable for this purpose.

#### BY-PRODUCTS.

In the modern methods of economic production and manufacture nothing is permitted to go to waste. Whoever it was that said facetiously that the packers saved every portion of a hog but his squeal spoke the whole truth. The same truth applies as well to the carcass of any food animal. In the case of goats the horns find many uses, and the fat is said to be the best tallow known for the manufacture of candles. Any part of the carcass not useful in any other way is converted into fertilizer.

#### LOCALITIES ADAPTED TO ANGORA CULTURE.

##### CLIMATE.

So far as temperature is concerned, no place has been found that is too hot or too cold for Angoras. Although not partial to heat, they will stand it quite as easily as sheep. Shade is essential to success if the sunshine is very warm.

The climate in Angora, where the breed originated and is still supposed to flourish in its more perfect state, is extreme. A temperature as high as 85° F. is registered in the summer and as low as 0° F. in the winter. In Cape of Good Hope, where they are thriving well, the temperature goes higher in the summer, but not so low in the winter. The United States presents a wider range of temperature, where, in southern Texas and New Mexico, it may go above 100° F. in the summer, and in Idaho as low as 30° F. below zero in winter. The range of localities where Angoras have done well is from Guadalupe Islands, in the Lesser Antilles, to Ukamak Island, belonging to the Alaska Peninsula. Mr. M. L. Washburn, superintendent for the Alaska Com-

mercial Company at Kadiak, says: "On Ukamak Island we have a flock of Angora goats, which have increased 60 per cent a year since they were placed there. They have given very good results in mohair, which is of good quality and fine texture." There are a few small flocks in New England and in nearly every State west until the Pacific Ocean is reached. The Western States have many thousands. Mr. William M. Landrum is quoted as follows:

White goats can stand any amount of cold and snow, but sleet and wind are very injurious. On the other hand, they can endure the scorching heat of the Tropics. Their fleece is best at an altitude of from 3,000 to 6,000 feet above the sea level. The fleece never sheds on the Guadalupe Island, 210 miles from San Diego, at an altitude of only from 2,000 to 4,000 feet. I have grown mohair there 2 feet long, of lovely texture. We had 80,000 wild goats roaming on the island without any attention, except in slaughtering season, when we sheared the Angoras and slaughtered from 14,000 to 15,000 common goats for their hides and tallow. The goats all ran wild and took care of themselves. We were not at one dollar expense on them.

In considering Angora culture it is of more importance to study the climate with reference to moisture rather than temperature. It should be remembered that the original home of the goat is high up in the mountains, where the air is not laden with moisture. Under like conditions it thrives best here. Lowlands that are wet or marshy are not at all suitable. The effect of such situations soon makes itself apparent in a flock of goats. Foot rot is apt to give endless trouble, and the feet will need much attention in other respects. Therefore lowlands with much moisture and high temperature are not recommended for goat culture. It is a historical fact that the first effort to transplant the Angora goat outside of Asia was a failure on account of these conditions. This was in 1554, when a few individuals were taken to Holland, but they soon died, owing to the moist climate.

The effect of climate has a great deal to do with the character of mohair. On this point Mr. John S. Harris, of Oakley, Idaho, who is a gentleman of much experience, is quoted:

Mohair grown here in Idaho is very bright when scoured, and, owing to the electric currents which exist in the air, the hair possesses elasticity, a property requisite to mohair. Goats do not grow a long staple here, but owing to the cold it is very dense. Neither do they grow so heavy a fleece as in a milder climate, owing to the dryness of the air. Plenty of green, natural herbage the year round would produce a heavier fleece and ultimately deteriorate its quality.

A high altitude is a locality always preferable in goat culture. This is especially true with Angoras, as the climate in high altitudes seems to have a beneficial effect upon the mohair.

Colonel Black, whose experience covers a period of thirty years, says that the Angora goat will thrive in any part of our country, and the yield of mohair will be greatest in the colder States. He estimates that the yield can be increased fully 1 pound by removing the goats from Texas to any of the Northern States.

## CHARACTER OF SOIL.

Almost any kind of soil, except wet and marshy land, is suitable for these goats. Their preference is mountainous or rocky land, where they find it necessary to climb mountain sides and rocky cliffs to browse. Such situations not only afford them satisfaction in climbing and feeding, but the rocks serve to keep the feet trimmed. This is an important matter, for on soils devoid of stones or sand the feet must oftentimes be trimmed by hand.

One of the reasons for the freedom of goats from most diseases is that they require pure water, and in no place is better water found than in the springs and rivulets of hilly or rocky localities. Goats also require much exercise, much more than sheep, and such situations satisfy this inclination.

However, it must not be understood that rocks and hills are essential, although they provide for the goat an ideal situation. As stated above, almost any kind of soil is suitable except wet and marshy land. Goats are not partial to water in any form—in the soil or in the form of rain, snow, or sleet—and they drink a very small amount. Keep the goats dry overhead and under foot.

## LAND AVAILABLE FOR GOAT CULTURE.

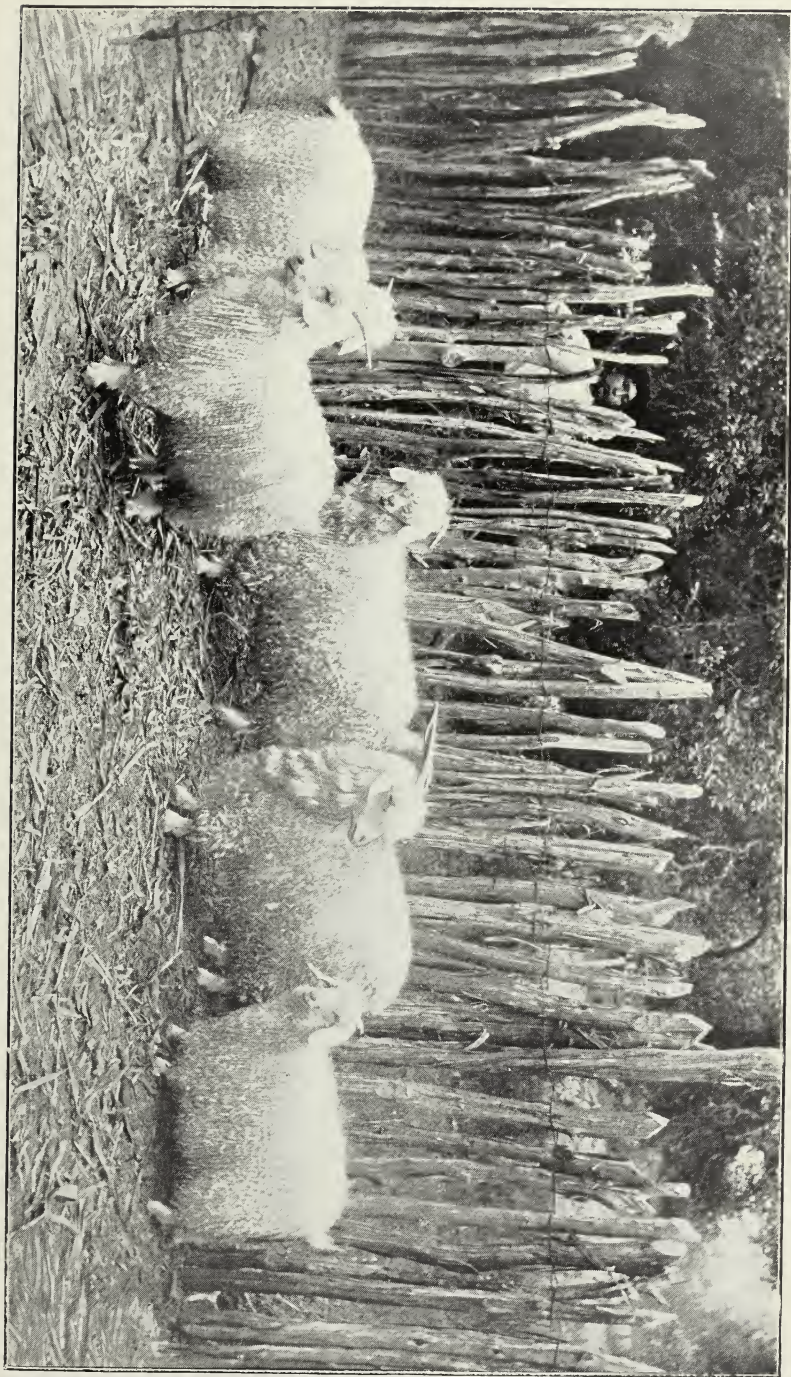
The habits of goats, as set forth in the earlier paragraphs of this paper, suggest at once to the informed person that there are in the United States millions of acres of land suitable for goat culture which are now serving no economic purpose whatever. Much of this would answer for sheep raising, but much more of it is suitable for goats only.

In the northwestern States there are hundreds of thousands of acres of forest land which, on account of the forest covering, is useless, but when goats clear it of all underbrush and put it in proper condition for cultivation, as they are doing there at this time, the land becomes more valuable for other kinds of farm crops. In other places there is much brush land which it is desirable to have goats transform into good pasture land, and there are also vast acres of mountainous and hilly districts which are ideal locations for Angora goats, but which could be of no importance as pasture or as tillable land.

Capt. Almont Barnes, in the article entitled "Keeping goats for profit," makes some estimates of the amount of unimproved land in the country, basing his calculations upon the reports of the Eleventh Census. He finds that the total amount of unimproved land in the United States is 265,000,000 acres. In Maine there are 6,000,000 acres in farms, of which 3,000,000 are improved; in Georgia are 25,000,000 in farms, of which 9,500,000 are improved. He concludes:

There is, however, in the United States a large, continuous area, embracing over one-third of the States and Territories, which invites particular attention in connection with this subject. It includes the South Atlantic and South Central divisions

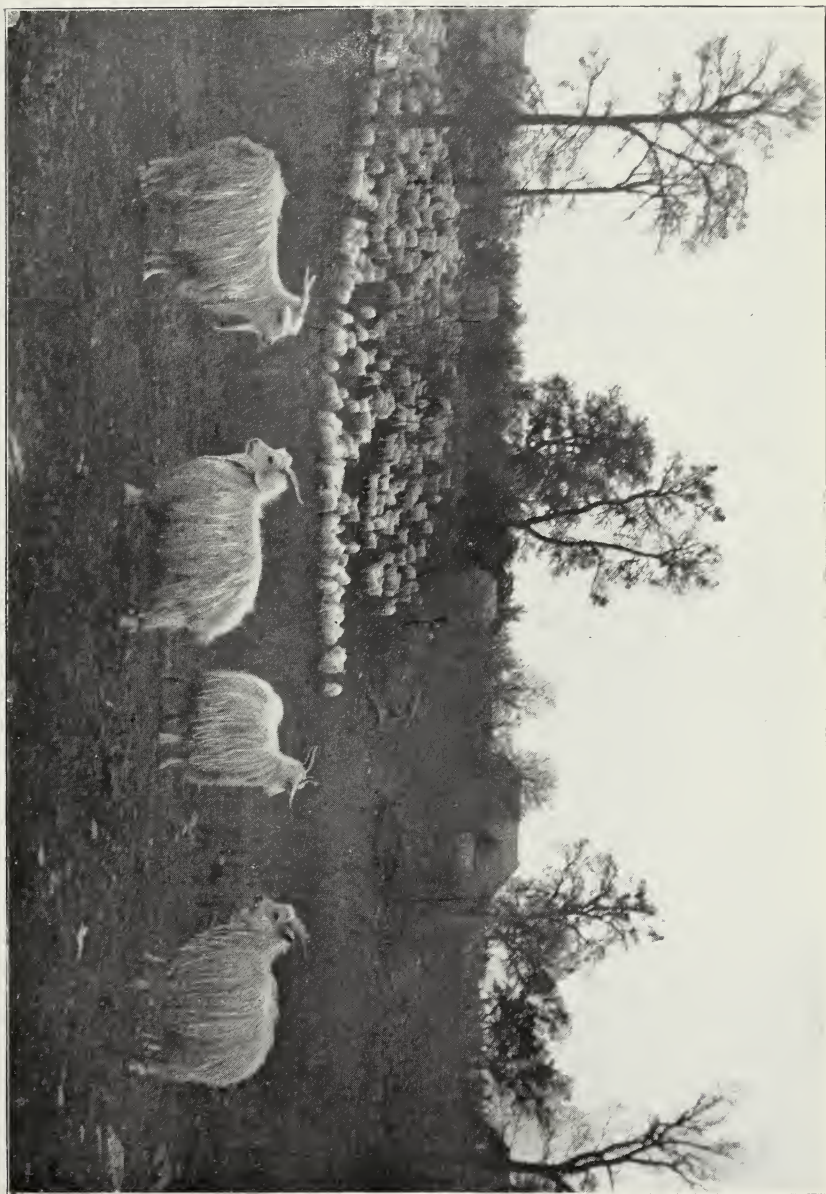




ANGORA GOATS IN YARD : ALSO SHOWS ONE KIND OF SUITABLE FENCE.

( Photograph furnished by Harris & Baylor, Montell, Tex. )





ANGORA GOAT RANCH OF H. T. FUCHS, TIGER MILLS, TEX.

(Photograph furnished by Mr. Fuchs.)







and a part of the Western division of the Census groupings<sup>1</sup>, or twenty States and Territories, which together contain nearly 285,000,000 acres in farms, of which over 122,000,000 are improved and over 162,000,000, or 57 per cent, unimproved. The average size of farms and the average amounts of unimproved land are greater in this area than elsewhere, and the climatic conditions are more uniform.

It is safe to say that it will be many years before the matter of available land for goat culture becomes a problem. It is sufficient at this time to know that there is an abundance of suitable land everywhere in the country.

Mr. W. Hammond Tooke, in the *Agricultural Journal of Cape of Good Hope* for May, 1899, says:

He [Schreiner] admits that it is generally agreed that very large portions of the States are well adapted to Angora goats, an opinion formed from actual experience over a number of years. This being so, it is difficult to understand how it is that the industry has progressed so slowly, seeing that the hair is valuable, the skins in great demand, the flesh prized as good, and the tallow as good as any that reaches the Chicago market. It is not more easy to understand when it is considered that large portions of the country are suitable for goats and not suitable for sheep.

There seems no reason, therefore, to the outsider why the industry should not make almost as rapid progress in the States as it has in South Africa.

#### THE CARE OF ANGORA GOATS.

The preceding pages have no doubt given the impression that Angora goats are very hardy, and, indeed, it is true, especially if their foundation is upon crosses with the common goat; but this should not be taken by the careless or shiftless man as a license to subject his goats to all manner of discomfort with the expectation that the results will be fully as satisfactory as if rational attention were given them. That these animals can withstand extreme cold, such as that of the islands of Alaska, or extreme heat, such as that of Guadalupe Island, is strong evidence of their fortitude and of their adaptability to a wide range of temperature under proper care. The same fortitude is exhibited by horses, cattle, sheep, and hogs, but no one thinks of turning these domesticated animals out upon their own resources, as wild animals are forced to exist. That they can subsist upon vegetation which is utterly useless for any other purpose is evidence simply of their economical keeping; it does not permit one to conclude that they never need any other kind of feed at times. In a word, it is intended here to impress the fact that, if satisfactory results are to be obtained in goat raising, the animals must receive the same rational treatment that is received by other live stock when best results are sought. The goat is a hardy animal in the fullest sense of the word, but this characteristic only enables him to respond the more quickly and satisfactorily to careful treatment.

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<sup>1</sup> South Atlantic division: Delaware, Maryland, District of Columbia, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida; South Central division: Kentucky, Tennessee, Alabama, Mississippi, Louisiana, Texas, Oklahoma, Arkansas; Western division: Montana, Wyoming, Colorado, New Mexico, Arizona, Utah, Nevada, Idaho, Washington, Oregon, California.

## HERDING AND FENCING.

Goats require a great amount of exercise, much more than sheep. The one is by nature a browser and the other a grazer, and the browsing habit naturally requires more activity on the part of the goats. They are sensitive to restraint and do better if not herded, but of course this is often a necessity, and therefore should be done under as favorable circumstances as possible. So far as possible they should not be allowed to feel their restraint. If constant attendance is necessary, the herder should be of quiet disposition. The next best thing to the freedom of a range is a large pasture, where the goats may have oversight, but not constant attendance. Such pastures are considered the cheapest method of keeping these goats. They can easily be trained to come home by feeding a little and salting regularly at home.

The fencing for pastures is a matter which early concerns one who contemplates going into the business, for it is the current belief that goats will climb onto any shed of ordinary height or jump any fence that will stop other animals. While they will climb anything that is built in such a manner that it may be climbed easily, they will not jump any ordinary fence. They will, however, creep through if there is an opening large enough. The old-fashioned "worm" fence, especially if it leans outward, will not stop goats. The angles in such a fence are an incentive and a delight to them. Indeed, there are many hogs that will go over a fence of this kind.

In building a goat fence there are other matters to be taken into account than simply that the goats shall be kept in: the animals themselves (especially the young ones) must be protected from dogs and wolves from the outside. In the Southwest it is much more important to fence to keep varmints out than it is to fence to keep the goats in. So the double object must be kept in view in building a goat fence. Such a fence must be dogproof, hogproof, and wolfproof. A hog at liberty which has once had the taste of chicken, or lamb, or kid is a greater nuisance than any wolf or dog, and should be dispatched as being an enemy to other young live stock as well as kids.

One correspondent of the Bureau constructs a fence of ten-barbed hog wires, with posts set 20 feet apart, having three stays between the posts. The lowest wire is only 1 inch from the ground; the next four wires  $3\frac{1}{4}$  inches apart, and one-half inch added to every space above. It is necessary that all the wires should be kept very tight. This correspondent adds the interesting note that many wolves are killed by screw worms in wounds received while attempting to crawl through such a fence. A good fence may be made of woven wire 3 feet high, drawn on the inside of the posts, and a closely barbed strand of wire 3 or 4 inches above fastened to the outside of the posts to prevent animals from jumping in. A straight rail fence, if the rails are laid close enough, as well as an ordinary board fence, will turn goats.

Mr. Jobson says that a five-board panel fence 4 feet high is sufficient for goats. He also says that zigzag, or worm, fences are an incentive for the goats to climb, and that they will walk along the top of such fences as easily as on the ground.

If they are permitted to climb onto the roofs of buildings it will not be long before they will have them completely ruined.

#### SHELTER AND PENS.

A shelter is necessary during wet spells, and more especially if the rain is cold or in case of a sleet storm. Dry cold alone has little or no injurious effect after the kids are three or four weeks old, and they will even frolic in the snow when the mercury is at zero, and sleep with apparent comfort in an open shed. With their dense covering there is no reason why this should not be true; but this same dense covering, when soaked with cold water or driven full of sleet, is a deadly menace. Goats will not get wet if they have an opportunity to avoid it. They appreciate a shelter and will always seek it at night, and during the day in the event of storms. They are said to be excellent barometers, being able to foretell stormy weather, and always contrive to place themselves under shelter before the advance of a storm, if possible. Mr. Diehl says they will run miles to avoid an undesirable rain.

Goats should not be left on the range or in pasture over night. The latter is practiced to a considerable extent, but experience has shown that they are safer in closer confinement during the nighttime.

The pens in which the goats are kept at night should, above all things, be in such a location that they can be kept dry by drainage. Other live stock should be excluded, as they would only help to trample the ground into mud. They should have a dry place to stand and sleep, for they are apt to contract rheumatism in the knees. There would be little use in raising Angoras for their fleeces if they are compelled to wade through mud and filth, or be confined under these conditions. The fleece would soon become so soiled and matted as to be a "burden unto death."

The sheds provided for their shelter must be of a size to give an abundance of room. The goats should not, under any circumstances, be huddled together. If they are thus crowded in cold weather they will pile up, with the result that some of the younger ones will die from suffocation. One writer states that he has known as high as 30 being killed in this manner in one night. Mr. Oscar Tom, of Angora, Oreg., describes a shelter that proves satisfactory in the following language:

The sheds should have eave troughs, and be boarded down to within 3 or 4 feet of the ground. There should be a ditch around the shed to prevent any water from running into it, and it should be open all around, so that the goats would not have to wait for others ahead of them to go in; a few cross ones could not block the way and

keep other goats in or out, and the rain would not blow in, but the goats would have plenty of fresh air. There should be a good fence around the shed at a distance of at least 50 yards, to keep cattle and horses from trampling up the ground and working it into mud. Have the fence high enough for the goats to go under, but never allow hogs to run into the goat shed, for goats are easily frightened after dark.

In some parts of the country the strong winds will blow rain under a shed such as Mr. Tom describes. In such cases, the side from which these storms usually come might be boarded to the ground. A better plan, in the opinion of some, is to have a few solid movable panels of fence to place around the openings of the shed on such occasions. This plan is convenient, too, as the panels may be taken away in fair weather, thus permitting a free circulation of air from all sides.

Shelter from the sun's rays should be provided for summer time. Although goats are able to withstand intense heat, they do not thrive well when subjected to it. For this purpose sheds more open than that described above are preferred, for the reason that the air will have freer circulation. Better yet than a shed against the sun's rays are large trees. In this case there is no obstruction whatever to the air.

#### FEEDING.

The principal reason why goats will be raised instead of sheep in some places is because they are practically inexpensive so far as feeding is concerned. This phase of the subject is quite fully discussed under the head of "Browsing and pasturage" (p. 26). They eat the leaves in summer and the soft twigs in winter, and if there is an abundance of either they will not require anything else to sustain life; but this condition exists only in certain localities, and other means must be adopted elsewhere. They are fond of straw and fodder of any kind. Plate XI shows where a herd in Iowa has access to a straw stack.

Notwithstanding the ability of goats to subsist upon coarse fodder in the winter season, the impression must not be held that they will thrive well upon it in the absence of browse. They will extract from these fodders all the nourishment obtainable, which is not very great, but must receive some supplementary feed. Any kind of grain will answer this purpose. Probably the best feed is oats, and if it is sheaf oats better still. In Texas some of the large goat raisers feed cotton seed by scattering it upon the snow so that goats will have to exercise somewhat in picking it up; besides, the time consumed in picking up the seed thus scattered insures better mastication.

In feeding grain care must be taken not to make the supply too liberal, unless the object is to fatten for slaughter. Goats easily become lazy on a plentiful supply of grain and will decline to go out to feed upon the brush. This is an important point, as their hardiness to a large extent is attributed to their feeding upon browse and to the resulting exercise.



As to the coarse feed for winter use, straw is eaten with relish; corn fodder is better and more nourishing; clover and alfalfa hay are excellent. Indeed, very little grain will be required where either clover or alfalfa hay is provided. Mr. Hoerle says:

The quantity of food necessary to keep them in good condition varies according to the climate, but one-fourth pound of corn or its equivalent in other grain and  $1\frac{1}{4}$  pounds of hay at a ration is about a fair average. With abundant winter pasture this ration once a day (in the evening) is sufficient; if the pasture is scant, they ought to have it both morning and evening, and on wet, cold days, when they are kept in the sheds all day, feed them three times or make their rations correspondingly larger. They should be taught early to eat their hay chopped, moistened, and sprinkled with bran, oil meal, or corn meal, which, if it digests easier if given in that way, will save about 20 per cent of the feed. They should also be taught to eat ensilage where practicable.

Sugar-beet pulp has been fed with success. The goats must be taught to eat it, but after once learning they seem not to be able to get enough.

In feeding either hay or grain absolute cleanliness must rule, as goats will not eat soiled food. There is no animal more particular about his food than the goat. He has no inclination for mud or filth in which to stand or walk, much less having to pick his food out of it. Bryan Hook, author of *Milch Goats and Their Management*,<sup>1</sup> says:

The goat is of all animals the most fastidious in the matter of the cleanliness of its food, refusing, even though ever so hungry, to eat food that has been soiled or trodden under foot. For this reason a rack should be provided for the hay, and only as much given at each meal as the animal will consume, for that which has been trampled under foot will ever after be rejected, even though carefully collected and replaced in the rack.

When the production of mohair is reduced to a fine art, the question of feed will receive the most careful consideration, because of its influence upon the fiber.

The replies received by the Bureau to the question "Do you feed in winter? If so, what is the character of feed?" are interesting in many particulars. It will be observed that in the Southwest the treatment of goats in winter is not very different from that received by them in the summer. Below are given quotations from some of the letters received, credit being given to States only:

Winters being mild, do not feed.—*Arizona*.

I have to feed here. They like alfalfa best. In southern New Mexico they never need any feed, and are good mutton the year round.—*New Mexico*.

We do not feed, there being plenty of evergreen brush.—*New Mexico*.

Feed only during severe storms, perhaps an average of three days in the winter, and then any kind of good hay will suffice.—*Texas*.

Feed some poor old goats on cotton seed and hay.—*Texas*.

Winters are mild, and the goats live on evergreen brush (four kinds).—*Texas*.

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<sup>1</sup> Vinton & Co., Limited. London, 1896.

Feed only when the ground is covered with snow and sleet. I like shelled corn best. Feed in troughs or scattered on the snow.—*Texas*.

Yes; in stormy winters we feed hay so placed that they can run to it in the shed, for they must have shelter.—*Oregon*.

Native hay.—*Oregon*.

Very little; a few oats, and straw.—*Oregon*.

We manage to cut grubs in winter, but give them some straw; will eat most any kind of straw or hay.—*Oregon*.

I feed out in the prairie, along with the sheep; feed wild hay and lucern (alfalfa).—*Idaho*.

Hay, oat hay, and corn from shock, unhusked; some roots, and more or less bran.—*Iowa*.

Sheaf oats, fodder, straw, and hay in spring.—*Iowa*.

They run on the range all winter.—*Texas*.

Have never had occasion to feed, except during a snowstorm, when we cut down branches of live oak.—*Texas*.

Do not feed, except the bucks at breeding time; give them wheat hay and barley.—*Texas*.

In Nevada we feed our kids some alfalfa hay, at night, for two or three months.—*Nevada*.

I find shelled oats best for weakly ones; usually cut brush for the main herd during winter months.—*Oregon*.

We find clover hay and wheat and oats cut in the dough. We prefer that to anything else.—*Oregon*.

Stock fodder and clover hay. They will do well on the same feed as sheep.—*Missouri*.

Not much grain, a little corn fodder, and wheat straw.—*Kansas*.

Shredded corn fodder, wheat straw, and a little corn in bad weather.—*Kansas*.

#### SALTING.

Goats require more salt than sheep, owing to the more astringent character of their food. If loose salt is used, the general custom is to give it once a week on regular days. If rock salt is used, it should be placed where the animals can get to it at any time. Rock salt is preferable, as it can be placed in boxes or troughs raised from the ground, and thus be kept out of the dirt and be of easy access to the goats at any time; and, too, there is no waste and no danger that the animal will eat too much of it.

#### MARKING.

The question of marking is always proper. Several devices are in use, but the metal tag in the ear is probably best known. A practice which appears to give satisfaction is to tattoo the numbers into the ear, using indelible ink. It is found that the metal is sometimes pulled out by brush.

## KIDDING AND THE KIDS.

The kidding time is the most important in the life of the goats. For two or three days after the kids are dropped they are exceedingly delicate, and there will be no future success unless good care is given at the time. They can not "rough it" at this period, but will die from very little exposure or neglect. They are more delicate for a few weeks than lambs. When the kids are large enough to follow the flock they have constitutions stronger than lambs of like age and are able to care for themselves very well.

The proper time for kids to arrive is in the spring, about the time when leaves start on the trees and bushes. At that time there is milk-producing food for the doe, and the weather is also warm enough to favor the kids. The exact time may be governed, of course, by the service of the bucks and will be earlier in localities where the seasons are earlier. If kidding comes in cold weather, there will be greater difficulty in saving the kids. Warm stabling must also be provided, and the does will require extra feeding in order that they may supply milk for the kids.

A few days before a kid is due the doe should be separated from the flock. Some breeders would put her in a pen alone, while others would put as many as 20 in one pen. If the facilities are at hand, a small pen for each doe is better, for the reasons that the doe will sooner "own" the kid and there will be less danger of injury than if among a number. A doe knows her kid by the sense of smell, especially when it is young. This characteristic is so strong that some breeders assert that if two kids of different mothers are rubbed together, the does will often refuse to own them. Whoever cares for the doe at kidding time will find it an important part of his work to see that the does own their kids. This difficulty in any case will disappear in a few days, and it will then only be necessary to arrange for the does to get to the kids whenever they desire.

If kids are dropped on the range or in the pasture, they must be carried home and special care given to see that the does are made to own them, for many times they will refuse. A lamb will follow its mother very soon after it is dropped, but a doe will hide her kid as best she can in bushes, or behind a stone or log, and leave it there while she goes away to feed; and on her return she expects to find it where she left it.

The Mexican method of handling the kid is largely practiced in Texas and New Mexico and consists in "staking," or "toggling," the kid. When the kid is dropped, take it to a protected place (shed or barn), seeing to it that the doe follows, and "stake it out" or "toggle" it with a string about 14 inches long. Tie this string to one leg, changing occasionally to other legs to avoid lameness. This string should have a swivel in it to prevent twisting, and the kids should be

carefully watched so long as they are so tied, which will be from seven to ten days.

The does should remain with the kids until they leave them of their own accord to go out for feed. The kids may then be allowed to run loose in a pen together until they are large enough to go out with the flock, which is when they are from four to six weeks' old, or when they are able to jump a board from 12 to 20 inches high placed across the gate. The height of this board restrains the kids that are too small to follow the flock and at the same time enables the does to go and come as they please. W. G. Hughes & Co., of Hastings, Tex., have a device for separating the does from the kids which is better than the board. It is a bridge, either end of which drops to the desired height. This device enables the does to go out and in without injuring the udder, which is apt to occur where they have to jump a board. A picture of this bridge in use is shown in fig. 2 of Plate XII.

The following is from "California Angoras," published by C. P. Bailey & Sons Company:

There are in use two methods of handling kids at kidding time, namely, the corral method and the staking method. Each of these has points which render it most valuable under certain conditions and in certain localities.

#### *The corral method.*

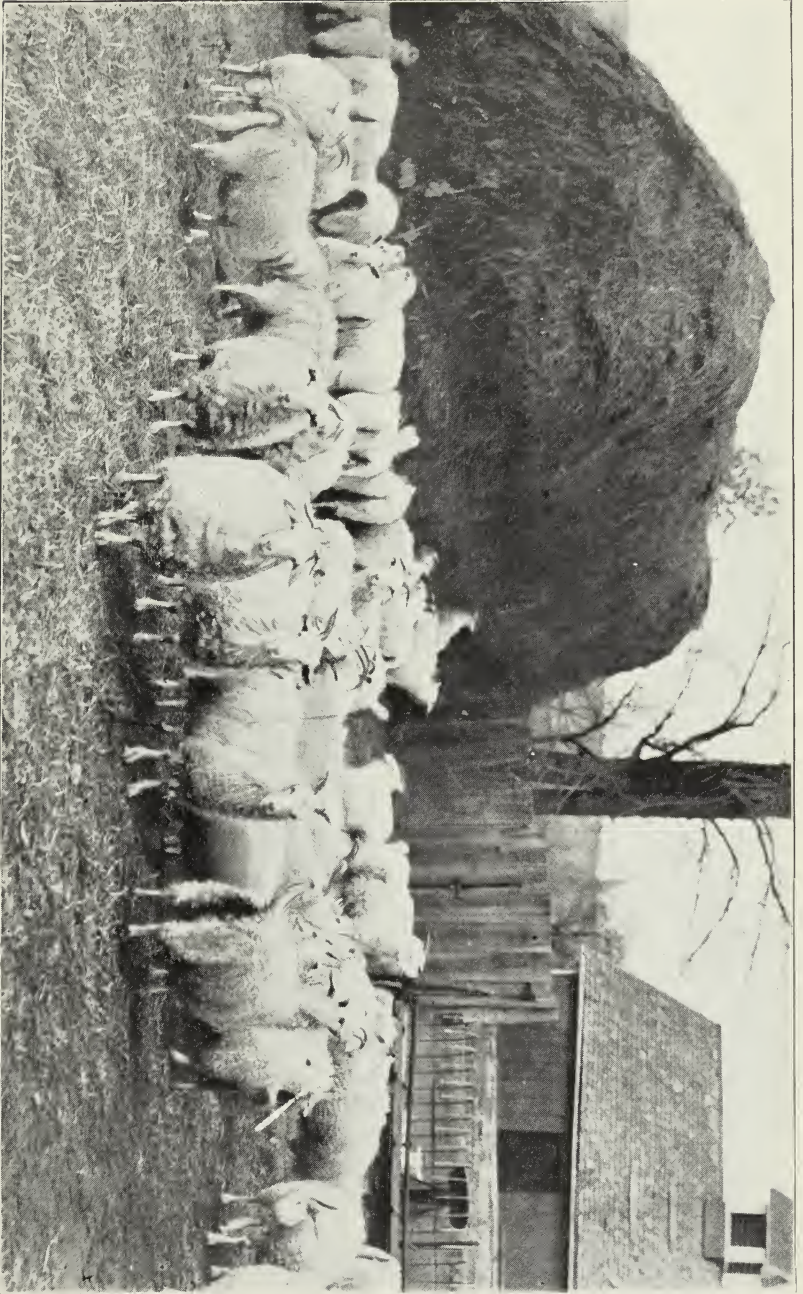
This method may be used with any number of goats. With various modifications and adaptations which best suit the size of the flock, the climatic conditions, the facilities for feeding, etc., it may be used by the beginner with success. We have practiced this method in Nevada for more than twenty-five years. If the herd is a large one, say 1,000 head, three men are required to handle the goats at kidding time. The service of the bucks is so managed that the kids will be dropped gradually through several weeks. At the height of the season we expect from 75 to 100 kids a day. The season lasts about thirty or forty days. Fortunately, most of the kids are dropped in the daytime.

We have four or five small corrals, fenced with 36-inch woven wire and large enough to hold 50 does and their kids. The doe should be allowed plenty of room, because if too close to her neighbor she may adopt the other doe's kid. Besides these small corrals, two large ones are needed, each large enough to hold 1,000 does. Along the fence of one of these corrals are a dozen small pens just large enough to hold a doe and kid. At the gate of this large corral a jump board is placed. This jump board is intended to keep back those kids which are not large and strong enough to jump over it. A 2-inch board about 18 inches high will answer the purpose. Another device sometimes used is a platform open at the end, so that the kids may run under it and thus avoid being trampled upon when the goats are going out over the platform.

The small corrals may be made of panel fence and located in a meadow where some feed is afforded. The does should always have some kind of feed at kidding time.

In the morning the flock is carefully examined, and all does which show signs of kidding during the day should be separated and placed in one of the small corrals. The large flock is now turned out, and one of the men is sent with them with instructions to take the herd at once as far as he intends to go for feed that day, and then





FLOCK OF ANGORA GOATS AT STRAW STACK.

(Photograph furnished by Capt. J. Murray Hoag, Maquoketa, Iowa.)





FIG. 1.—ANGORA KIDS.

(Illustration furnished by W. G. Hughes & Co., Hastings, Tex.)



FIG. 2.—GOING TO PASTURE. (SEPARATION OF DOES FROM KIDS BY MEANS OF BRIDGE.)

(Illustration furnished by W. G. Hughes & Co., Hastings, Tex.)





to let them feed over a limited area and gradually work their way home. A few does will drop their kids on the range, and the herder should carefully note the number and their location. He should see that the herd does not feed around one of these does, as she is apt to leave her kid and join the band, thus necessitating much extra work in finding the kid and in giving it to its mother. Early in the afternoon the band is placed in one of the large corrals. Now the herder and another man go out with a wagon or on foot and carry the kids home, gently driving the mothers. The kids should not be handled or rubbed against one another more than is necessary, as the doe knows her kid by the scent. These does and kids are placed in the small corral which contains the does held back in the morning with the expectation that they would kid during the day. We now have one day's kidding in one of the small corrals. The does and kids should be watched to see that they are properly arranged. Do not bother them more than is absolutely necessary. Do not be in a hurry to make a doe own a kid. Do not drive the goats around one of the small pens.

The does should remain with their kids in the corral for a day or two at least, or until the kids are properly mothered. Any does which have not kidded should be taken out. The next morning any kids which may have been born during the night are put in another small corral with their mothers, as well as the does which are expected to kid during the day. The procedure of the previous day is repeated. In about three days, if one has limited quarters, the first day's mothers and kids may be put in the second large corral; that is, the one with the jump board at the gate. Now this "wet" band is placed in charge of one of the men and sent out to feed. The gate is opened, the mothers passing out over the jump board, and the kids remain in the corral. The herder must not range his goats near the does that are kidding upon the range, and he should be cautioned to come in later than the "dry" band, so as to avoid any possibility of their mixing. When his band arrives at the corral the gate is opened, and each mother hunts for her kid. Some of the kids may not find their mothers, and if after a day or two there are a few unnourished kids and some does with overdistended udders they should be placed together in the small pens along the side of the corral. The doe will own the kid in a day or two, whether she is its mother or not. The kids should not be allowed to become too weak before this is done. If one does not have enough small pens, a doe may be held while two or three kids suckle her, and thus tide them over until some of the small pens are vacant.

The next day the second day's kidding is added to the wet band. The wet band thus gradually grows, while the dry band decreases. During the day two men will be employed at herding the dry and wet bands, respectively, and the third man will be kept busy inspecting the kids, feeding the does in confinement, etc. If the weather is stormy some of the kids will have to be sheltered. The advisability of having the kids dropped gradually through a period of thirty or forty days will readily be seen. If help is inexperienced they may be gradually trained, or if the weather is stormy there will be time to get all things arranged properly.

The kids should not be allowed to go with their mothers until they are about 6 or 8 weeks old. If they go before this, they will probably become tired very soon and go to sleep. When they awake the band will have gone, and they are liable to be lost. During the day, while the mothers are feeding, the kids would eat a little grass if they could be herded near the corral.

As stated before, there may be many modifications of this method which will suggest themselves, but the above is a general outline of a method commonly in use.

#### *The staking method.*

This method is largely employed, even with large flocks, in New Mexico, but is possibly best suited to small flocks. It is without doubt the best method for certain surroundings. About the same amount of help will be required as with the corral

method. There should be a good supply of stakes similar to tent stakes. There should also be a supply of swivel blocks which are about 4 inches long and having a hole bored near each end. A piece of rope about 6 inches long is fastened to the stake, and the other end is passed through one of the holes in the swivel block and a knot tied in the end. Another piece of rope of equal length is likewise knotted and passed through the other hole of the swivel block, the loose end being tied to the kid's leg. Any swivel will take the place of this primitive method. The herder or owner can busy himself during the winter months by making stakes and swivels and by cutting and attaching the ropes.

When a kid is born it is taken to a convenient place to stake and the mother is gently coaxed to follow. The stake is securely driven into the ground, and the kid fastened to it by the hind leg. The mother is left with the kid, in order that she may know where to find it upon returning from feeding. The kid should be staked where he can get plenty of sunshine, shade, and shelter. A small bush, a post, or a box will answer the purpose admirably. If there are twins, they must be so staked that they can suckle at the same time. The rope should be changed from one hind leg to the other occasionally, to prevent unequal development. Sometimes a vigorous kid gets thoroughly tangled and requires help.

The kid may thus be left staked until he is old enough to go with the flock, which is after six or eight weeks, or he may be put in a corral after a few days, as is done in the corral method.

There are many successful breeders who use this method entirely. One may expect to get good results if he follows either the corral or staking method carefully.

There is very small loss among kids cared for as set forth above. Many of the breeders on a large scale report the percentage of increase as 100. This does not mean that every kid lives, but that so few die that the loss is offset by the number of twins that are dropped.

The most practicable fencing to be used at kidding time is made of portable panels. By the use of these panels a pen may be made large or small and be moved from one place to another without difficulty and with very little work.

*Weaning.*—Kids should not be weaned until they are  $4\frac{1}{2}$  months old unless they are very strong; but they should not remain with their mothers after they are 5 months old. This especially applies to the buck kids, as they will often breed at 6 months of age or even younger.

*Castration.*—The buck kids not reserved for breeding purposes should be castrated when about two weeks old. The earlier it is done, the better will be the meat and the mohair. It is pointed out in previous pages that the mohair from wethers ranks with that from the does, and the flesh is superior to that of the does and inferior only in small degree to that of the kids. A cool day should always be selected for the operation of castration and careful attention given for a few days.

*Opinions of correspondents.*—The quotations given below are a symposium of the opinions of most of the leading breeders of Angora goats in the United States on the matter of kidding:

There are several methods of handling goats during kidding. The one employed here is the Mexican plan. When the kid is dropped take it by the hind legs, so that the doe will follow, to where you want to stake him. Stake with rope about 12

inches long, with wooden swivel in center. Leave them staked until after they are marked and castrated and well owned by the mother. Sometimes kids are herded with their mothers and sometimes by themselves until they learn to be herded. If not handled properly and the kids are allowed to mix together, the doe loses the scent of her kid, and young does will often disown them.—*F. O. Landrum, Laguna, Tex.*

This is the most critical period in the handling of goats. The kids are generally collected daily, as soon as dropped and able to stand and suckle the mother, and are confined in a corral for several weeks, much of the time tied to a stake driven into the ground. It is not safe to let them run with the flock until they are a month to six weeks of age, as they are liable to drop out of the flock and be lost.—*Col. W. L. Black, Fort McKavett, Tex.*

The kidding season is the time when the work and care comes. The kids are more delicate than lambs, and require a great deal of care.—*Harris & Baylor, Montell, Tex.*

The easiest way to get through kidding time is to put all the does that are soon to bring kids in a separate small pasture where they can be looked up easily. In case of bad weather they should be brought into their shed every evening before sundown; but if the weather is dry and not too cold they can be left out, and all the does will likely own their kids. Of course, the kids will not follow their mother as lambs do, but will lie down in a thicket or under a bush, a weed, a log, or a rock, and remain there till the mother comes back to it, even if it should have to wait till it starved to death; but after a kid is a few days old it is able to follow its mother, although it is best to keep the kids at home. Kids need not suck oftener than twice a day.—*II. T. Fuchs, Tiger Mills, Tex.*

I stake the kid in a barn for two weeks. The mother goes out in the daytime to feed and is put with the kid at night. After two weeks the kid is turned loose and kept in a pen until 2 months old, when it is allowed to go out with the flock.—*Henry Fink, Leon Springs, Tex.*

We keep the nannie and kid to themselves so far as possible for a day or so, and do not allow more than 20 nannies and kids in the same pen until the kids are over a week old, nor more than 50 nannies and kids in the same pen until 2 weeks old. Kids are kept in the pen day and night until a month old, and are then allowed to run outside the pen during the day to eat a little; the feed may be furnished them in the form of cut branches if there are no bushes near the pen. They should also have access to water after 4 weeks old. When 6 weeks old they can go out with the flock for a few hours in the afternoon, the flock being brought in at midday for this purpose. After eight weeks they can go regularly all day with the flock. We use a bridge for the purpose of "cutting back" such kids as should not go out with the flock.—*W. G. Hughes & Co., Hastings, Tex.*

Protection from rain; confinement in a corral or small pasture until the kids are 6 weeks old. We allow the does to jump over a 21-inch board to get food and return as they please. We separate all does every morning that will drop kids within two or three days and keep them in a pasture by themselves.—*Conklin Brothers, Newville, Cal.*

I put nannies that are soon to kid in an open pasture (not bushy). As the kids come, gather them into a corral with a shed or barn in it, taking the mothers with them. Keep the kids in the corral until they can jump over a 16-inch board, turning their mothers in and out evening and morning. At about 2 weeks of age they are usually fit to run with their mothers.—*George A. Houck, Eugene, Oreg.*

I aim to have a field of fall grain or reserved pasture to turn does in a few days before kidding commences, and turn the does in another pasture as fast as they drop their kids. Keep the kids up about two weeks, then let them go with their mothers.—*Oscar Tom, Angora, Oreg.*



Put the goats in a small pasture near a shed. If stormy, take the kid and doe to the shed at once. Every night put all the kids and does in the shed. Put bars up 20 inches high, and when the kid can jump over, let it go. Without a shed in this State you could not raise two out of ten kids; there is too much cold rain in kidding time—March and April.—*U. S. Grant, Dallas, Oreg.*

Put the nannies by themselves and then look after them once or twice a day to see that the kids are able to get up and suckle. Don't bother them, if they are all right and are in a sheltered place, until three or four days, and then change them to suit your convenience.—*W. W. Smith, Eola, Oreg.*

Take all the nannies out from the other goats as soon as they kid, and put them by themselves. I have about 100 small pens in which I put the nannies. Put the young nannies and old ones in different pens. Here they remain for four or five days and they are then turned into a larger pen, but not more than 50 should be put together.—*G. M. Scott, Malta, Idaho.*

Comfortable shelter and close watch to see that the kids get milk promptly. Put the doe and kid away from flock for a few days.—*J. Murray Hoag, Maquoketa, Iowa.*

We have a man on the spot all the time to help the goats in kidding, if necessary, and also to see that the kids begin to suck.—*Richardson Brothers, Dubuque, Iowa.*

Have good warm shelter, and under no circumstances allow cold rain to fall on the kids till after they are 2 weeks old. The shed should be open to the south, so that the sun can shine in on the kids. Turn the does out of the shed once a day, and leave the kids in the shed for the first two weeks. By that time the kids will be old enough to follow the doe.—*W. T. McIntire, Kansas City, Mo.*

I always keep the kids in a corral until they are old enough to follow the doe, which is when they are about thirty days old. In taking the kids to the corral care should be taken to get nothing on them that will change the scent, for does are very sensitive. If two kids from different does are rubbed together, the does will often refuse to own either of them. All kids should be castrated before two weeks old, as there is less danger and they do not get so sore.—*H. I. Kimball, Maxwell City, N. Mex.*

I cut out the heavy ewes from the rest of the herd, and hold them in a close herd, and catch the kids and bring them with their mothers to the corral, where each kid is staked separately with a toggle, or swivel, being careful to see that the mother knows where the kid is. After this I let the new mother goats come and go at will, only noticing them enough to see that they come to their kids regularly. The kids should be watched closely in order that they may not get tangled up and hurt. When they are about 2 weeks old they are turned loose in a corral and a board is put at the gate over which the mothers jump in going to and from their kids. When the kids are 3 months old they may be allowed to go with the herd.—*Josephus R. Barnette, Globe, Ariz.*

## THE BUILDING UP AND MANAGEMENT OF A FLOCK OF ANGORA GOATS.

### THE BEST FLOCK.

It is assumed that whoever goes into the business of raising Angora goats does so for the production of mohair, rather than meat or skins, and so it is to his interest to have a flock that will yield a profit from the beginning. The best flock for this purpose is one composed of thoroughbreds.<sup>1</sup> Such a flock will yield good mohair from the first.

<sup>1</sup>The term *purebreds* is not used here, as there is strong objection to it by many of the best breeders, on the ground that there are no purebreds, as explained elsewhere. As the term *thoroughbreds* will exactly suit the purposes of this chapter it is preferred, leaving the question of *purebreds* to be discussed by others.



Those who enter upon the business of goat raising, however, must make their operations conform to their capital, the same as in any other business. They will find that desirable does will cost from \$5 to \$12 each, and bucks all the way from \$50 to \$100 each; so that a large herd of this kind, although preferable, will cost a small fortune, and is beyond consideration by most people who will engage in the industry.

#### BUILDING UP A FLOCK FROM SMALL BEGINNING.

Another plan that may be pursued by one who has limited capital, but time and the patience to wait, is to begin with a few first-class animals and build up a flock from these. The result will be satisfactory, and the only drawback is the length of time required. After all, this may be the wisest plan for most beginners to pursue, as experience, so necessary always to success, will be gained as the flock increases.

#### BUILDING UP A FLOCK BY CROSSING UPON THE COMMON GOAT.

It is noted in the historical part of this paper that the Turks many years ago began the practice of crossing Angora bucks upon Kurd does. They probably had in mind the twofold purpose of producing thereby a hardier goat than the pure Angoras and of increasing the number of goats in order to supply the increased demand of Europe for mohair. Crossing the Angora bucks upon the common goats of the United States has been practiced since their introduction, and the results have been very satisfactory in many respects. Many of the large flocks of Texas and New Mexico have had Mexican does for their foundation. Building up a good mohair-producing flock upon this plan requires five or six years. The advantages are that the does with which the beginning is made are cheap, costing from \$1.50 to \$2.50 per head. During the first and second crosses there are many twin kids, thus increasing the herd in that proportion—a condition not existing, except to a small extent, among either the purebred or thoroughbred Angoras; the size and hardihood of the progeny are increased and the liability to disease decreased.

Care should be exercised in starting a flock by this method to select only such common does as are entirely white; any other color, however slight, is objectionable. If otherwise, the results might be satisfactory, but the probabilities would be the contrary. In handling the crosses the breeder often finds that atavism becomes apparent when it is most objectionable. For instance, the progeny for two generations of a doe having black spots might appear all that is desirable, while the third generation would produce the latent color.

In starting with a bunch of common goats that you want to use for raising a graded flock of shearing goats you should use only as pure white goats as you can get, and you should allow no colored goats in the flock. You should also dispose of all those that have long, coarse hair on the thigh and on the fore legs, below the shoulder.

In fact, the common goats that you want to start your flock with should be nice and smooth built, with small head and short, smooth hair and small horns. From muleys you can raise heavy shearers, but their mohair is not quite so fine.—*H. T. Fuchs, Tiger Mills, Tex.*

If bred for the purpose of quick propagation, and with very fine, robust goats of both sexes to begin with, in six years five or six crosses can easily be obtained if nutrimental advantages are favorable; and if really first-class bucks, having all the most valuable points this side of perfection, can be procured, and inbreeding carefully avoided, even our common short-haired and smooth-coated goat will, after the fourth cross—say, beginning with the thirty-second—show improvement, which in a large flock on general inspection would defy detection by anyone but an expert judge of Angora goats.—*G. A. Hoerle, Ridgewood, N. J.*

It is always quite necessary that the common does should be of the short-haired variety. Long-haired ones will give trouble in persisting to throw out long hairs among the mohair.

The buck used upon these does should be the best one can afford. The better the buck, the better the result. There will be many twins among the kids from this first cross, and if proper care is exercised at kidding time it will not be difficult to increase the flock as much as 100 per cent. The higher the cross, the fewer twins will be dropped. As the fleece upon the first cross is not worth more than the effort to clip it, the males among them should be castrated when about 2 weeks old and disposed of for meat as soon as old enough. The females among them, being half-blood Angoras, are kept for service with another thoroughbred buck. The result of this second cross is three-quarter blood Angoras. The mohair from them has a marketable value, but is very limited in quantity and usually mostly kemp. It is best to deal with this cross in the same manner as with the first cross. If this method of procedure is followed up to the fifth or sixth cross a flock will result that will produce most excellent mohair.

It has no doubt occurred to the reader that we now have four or five different grades of does, beginning with the common breed. Therefore after a thoroughbred flock has once been produced in this manner, each year brings forth another one from the same sources, and this condition continues as long as the breeding life of the does continues.

#### PROPER AGE FOR BREEDING.

Goats of both sexes will sometimes breed when they are 5 months old, and often at 6 months, but from the fact that they are at this age but a month or two from weaning time and are not nearly full grown, it is obvious that they should not be permitted to breed. They reach maturity when about 16 or 18 months old, and they ought not to breed before this time. If bred earlier the kids will not be so strong or so well developed. They are in their prime when from 2 to 6 years old, but with proper feeding in winter they have been known to breed regularly until 15 years old. The average life of goats, however, is about 12 years. There should be no tendency to keep does until they

are very old unless they bring kids of exceptional merit, for it must be remembered that their mohair gets coarser, and consequently less valuable, as they grow older.

The accompanying illustration (Fig. 1) shows how the age of goats may be determined until they are four years old. After that, in the absence of definite information, the age is a mere matter of guess, based upon the general appearance of the animal. The new teeth are longer and larger.

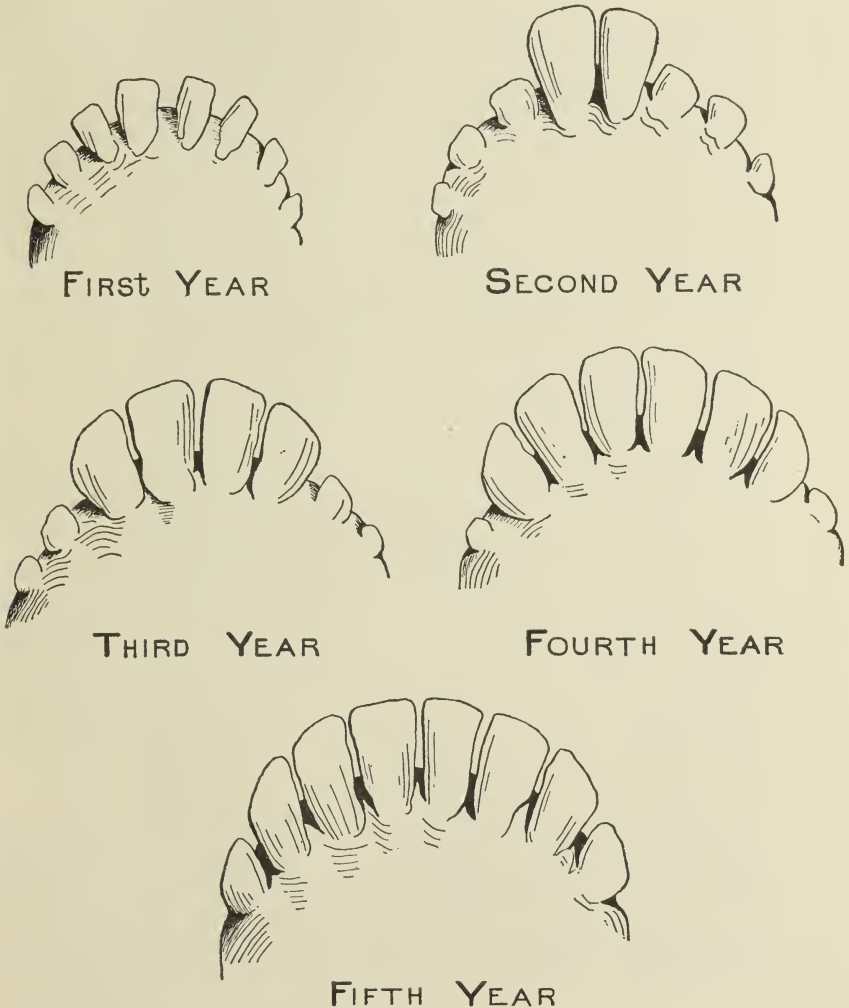


FIG. 1.—The age of goats shown by the teeth. [Copied from Bryan Hook's "Milch goats and their management."]

#### IN-AND-IN BREEDING.

In-and-in breeding means the breeding of related individuals. The term is indefinite, and with some refers to a close relationship and with others any degree of relationship. The correspondence of the Bureau

with goat raisers shows that the term with them means generally the breeding of individuals of close relationship.

It is safe to say that there is an overwhelming sentiment against the practice. This will be apparent after one has read the replies which are published herewith to the question, "What is your opinion of in-and-in breeding?" It is quite generally agreed, however, that this practice will give a fleece of finest fiber, having a beautiful luster and little oil, but the weight will not be so great. Those who favor the practice contend that the quality more than offsets the quantity. The animals resulting from this practice are not so large and strong as those which are not related. The fact must not be overlooked, however, that Mr. John S. Harris, of Oakley, Idaho, has followed in-and-in breeding continuously and with evident success, and, too, they are kept in a climate where the temperature in winter is sometimes far below zero. But Mr. Harris is a gentleman who understands the art of breeding; if all goat raisers knew so well the principles of breeding as he does there might not be so many to condemn the practice. However, they have learned much by experience, and it can not be contended that they are wrong in advising generally against the practice. Col. Richard Peters, the most successful breeder of his day, said that half-blood does can with best results be bred to their own sires, provided the sires have proved themselves to be good breeders.

If inbreeding of closely related animals is meant, it should not be resorted to with live stock of any kind except when individuals which show very desirable points are at the same time of very strong constitution and of good size. But, then, I would never hesitate to breed even parents to children. Strict observance of this rule I consider doubly necessary with Angoras, which are naturally tender and delicate, and it should be risked only when chances are very strong that the gain of fleece or shape will fully compensate for the inevitable loss of size and constitution. I believe that in a very few years that the value of the annual product of meat (from her offspring) of a doe will surpass that of her mohair. Besides, the more constitution is gained, the more apt are we to return to the original prolificness of the goat tribe, which has been entirely lost with Angoras in consequence of inbreeding. With the third free generation usually, but always with the fourth, bad effects of mating relations would not be felt any more.—*G. A. Hoerie, Ridgewood, N. J.*

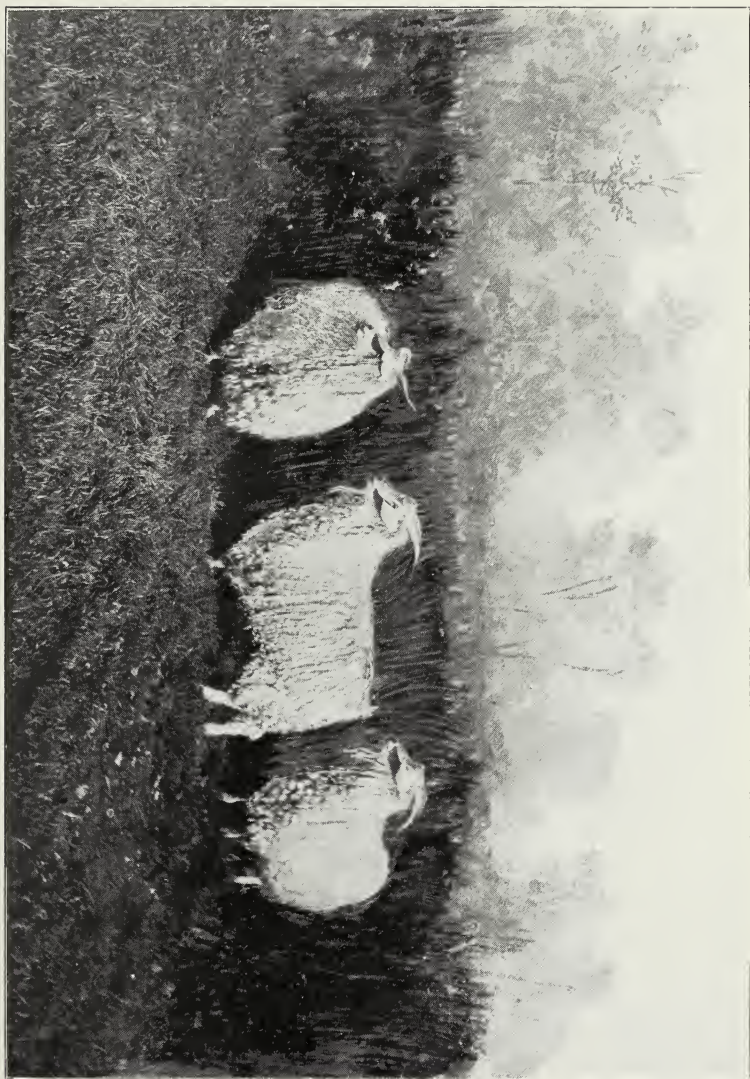
The opinion of our leading authorities, such as Professor Sanford and others, is that in-and-in breeding is the most successful way, and many cases are cited where this has been carried on for over thirty years. We have some breeders here who have been inbreeding for the past eight years, and the result, when the greatest of care is exercised, is that we have produced some very fine stock, as fine, I believe, as any that has been raised in this country. This in-and-in breeding is a very particular piece of work and should not be attempted by anyone unless he intends to give it his undivided attention. I believe it is the most successful way to breed for a fine fiber. The greatest trouble seems to be in the size of the animal, but if careful attention is paid to the work there is no excuse for losing size. We have demonstrated beyond all doubt that in-and-in breeding produces a finer wool, a longer wool, and a better wool; so if one desires to breed for fine wool he will have to follow in-and-in breeding.—*E. H. Jobson, Lake Valley, N. Mex.*





ANGORA GOATS IN ROCKY PASTURE.  
(Photograph furnished by H. J. Fuchs, Tiger Mills, Tex.)





ANGORA GOATS IN PASTURE.

(Photograph furnished by C. P. Bailey & Sons Company, San Jose, Cal.)





I think that to get a perfect goat one should inbreed to the finest buck or ewe obtainable; but don't keep it up too long, as the goat will be small and weakly.—*Josephus R. Barnette, Globe, Ariz.*

We think it should be avoided so far as possible, as it reduces the size and general stamina of the goat.—*W. G. Hughes & Co., Hastings, Tex.*

It will ruin a flock of goats the same as any other animal.—*R. C. Johnston, Lawrence, Kans.*

If done properly, closely watching defects, it is all right.—*J. R. Standley, Platteville, Iowa.*

Would not practice it if I could help it. We want goats with long, fine mohair, but at the same time we must look to the build of the goat.—*Q. M. Beck, Beargrove, Iowa.*

Am opposed to it on general principles. Would prefer it, however, to a moderate extent, to using inferior sires.—*J. Murray Hoag, Maquoketa, Iowa.*

I don't like inbreeding, as it weakens the goat. They don't have the ambition that fresh blood imparts to them.—*G. M. Scott, Malta, Idaho.*

They will be small and not strong, and harder to raise; will not shear so much, and more difficult to keep in flesh.—*W. W. Smith, Eola, Oreg.*

My stock are all inbred (600 does), but they are very small and tender. Would not advise it.—*V. Cladek, Larwood, Oreg.*

Once will do, provided you have an extra buck. After that you weaken the constitution of your goat.—*U. S. Grant, Dallas, Oreg.*

It can be practiced to advantage in producing a fine fleece, but if indulged too much will weaken the constitution and the goat will be small.—*Abe Blackburn, North Yamhill, Oreg.*

I believe, by careful selection of bucks, they can be improved, but I prefer crossing with new blood when it is just as good.—*Oscar Tom, Angora, Oreg.*

It shatters the constitution without a relative gain in weight of fleece. Fine mohair and light fleeces are all right, but I don't practice inbreeding. It produces such a goat as the practical man does not want.—*George A. Houck, Eugene, Oreg.*

We do not approve of it on general principles, but have not experimented much along this line.—*C. P. Bailey, San Jose, Cal.*

Under certain circumstances inbreeding for points in thoroughbreds is necessary, but it will degenerate a grade herd very quickly.—*Conklin Brothers, Newville, Cal.*

I do not like it and have never practiced it. I have seen it practiced, and the goats lack constitution.—*Henry Fink, Leon Springs, Tex.*

It brings the mohair to the greatest fineness if properly managed, but it should not be kept up too long.—*H. T. Fuchs, Tiger Mills, Tex.*

It is beneficial in the matter of improving the fleece, but a decided injury to the constitution and size of the animal.—*Col. W. L. Black, Fort McKavett, Tex.*

I used one billy five years. He was the best goat that I ever saw, shearing 10½ pounds of clean mohair annually.—*G. B. Miller, Gervais, Oreg.*

Inbreeding makes the fleece thinner and shorter and the constitution of the goat weaker.—*F. O. Landrum, Laguna, Tex.*

## MANAGEMENT OF THE BUCK.

Bucks usually come in heat about the middle of July and continue so about six months; does, however, do not usually come in heat until the latter part of August or the 1st of September. As the period of gestation in goats is from 147 to 155 days (or about five months), care must be taken in mating the animals in order to have the kids dropped in proper season, which will vary somewhat with the locality. The kids should not come before the warm days of spring, or when vegetation begins to put out vigorously. Therefore the buck should be put to service from November 1 to December 1, so that the kids will come about the 1st of April or May. The only objection to earlier kidding is the extra care required to preserve the life of the kids, for they are exceedingly delicate for a few days, as has been stated before, and even a little cold at this season will probably prove fatal.

A buck, like any other domestic animal, should be in the best possible condition when put to service. He should be well fed with grain for a few weeks before this time, and the feeding should be kept up until a few weeks after his service is ended.

As to the number of does which a buck may serve, there is a great diversity of opinion. The greater number of goat raisers, however, think forty or fifty is all that may be served with good results. Col. Richard Peters wrote that he had obtained the best results with two hundred breeding does by turning in with them ten selected bucks. His object was to have the kids come as nearly at one time as possible, thus shortening the period of careful watching. Referring to Colonel Peters's practice, Dr. J. R. Standley says he regards it a great success, and will adopt it in the future. He says, further: "I have tried the one-service system, also turning in bucks at night, removing them during the day, and other plans, but decidedly prefer Colonel Peters's plan."

Where there are very large flocks it is not always desirable that the kids should all come at one time. If they are dropped at intervals for a month one attendant may thus be enabled to look after a large number, whereas if all come about the same time one attendant could not do the work, and assistants who may be strangers to the flock would be necessary. (It is not well to have many strangers with these goats at any time, and certainly not at kidding time.) Upon this point Mr. G. A. Hoerle has written out a plan, given below, which is quite generally followed where there are large flocks:

A great difference of opinion exists as to how many ewes an Angora buck should be allowed to serve. This depends both upon the bucks and the condition they are in, as well as upon the length of the period during which you want the kids to drop. In a small herd, and where ample conveniences for kidding are furnished, so that good care can be taken of all the kids at once if necessary, one buck should serve from thirty to fifty (as above said, according to the animal); but should the flock be large, and owing to the uncertainty of the climate or the insufficient help or shelter

it should be desirable to have the kids drop gradually, say during a period of two months, especially when winter kidding is made a practice, from 75 to 150 ewes for each buck is not too much—again, according to animal and time. They should not run with the entire flock at once, but begin with say one-third to one-fourth of it, according to circumstances. The next similar fraction should be put in the breeding flock from two to five days later, and so on until gradually the entire flock is with the bucks. In this way a full crop of kids would be insured and at the same time the bucks prevented from doing excessive service.

The handling of “riginals” (ridgels) should have a word here. If the one testicle which descends is removed, the riginal will not get kids, but he will bother the does. If the descended testicle is not removed, he will breed without difficulty. He should be killed as soon as practicable.

#### NUMBER OF KIDS.

Thoroughbred Angora goats do not often drop more than one kid at a time, while the common goats nearly always drop two. There are many twins with the first cross, but the number diminishes as the crosses become higher. It is stated that the purebred Angoras never dropped but one at a time, and that the presence of twins in a flock is evidence of a base origin of the goats. The latter statement is disputed by some, who believe that the purebred Angora (having no trace whatever of base blood) will drop twins as regularly as the common goat.

#### SIZE OF FLOCKS.

All goat raisers agree that Angoras can not stand crowding together; and the higher the grade of the goats the more susceptible are they to injury from crowding. But to state just how many should be kept in a flock is difficult, as the number depends upon the character of their restraint. Where they have the range at day and large yards at night, the flocks may be very large, but where they have pastures and small pens at night the flock must not be large.

Writers upon the Angora industry have placed so much stress upon the point of overcrowding that the Bureau sought for information upon the question “What should be the size of Angora flocks?” Each correspondent replied with his own experience, and the conclusion is reached from the replies that they may be handled in flocks about as sheep are handled, the number depending wholly upon the capacity of the range or pasture, as the numbers reported for flocks are from 100 to 2,500. However, the danger from crowding is not disputed by any of the correspondents, and many of them mention it specifically. This phase of the matter must be carefully considered in connection with the question of housing and shelter. These must be ample to afford abundance of room and fresh air.

It is stated by some that goats running in small flocks shear more than the same number running in large flocks.

## DEHORNING.

Dehorning the goats has received very little consideration, and it is probable that Mr. Q. M. Beck, of Beargrove, Iowa, is the only goat raiser who is now practicing it. Many other breeders report that they do not dehorn but believe it practicable, while a very few express opposition to the practice. Mr. Beck writes as follows: "I dehorned forty-five head last fall (1889) and found it a success, as it stops a great deal of bunting, which is liable to cause abortion, saves shed room, saves broken legs, and will save many kids." These same reasons have brought the dehorning of cattle in quite general favor among feeders, and it is probable that as the Angora goat industry grows into a large industry the practice of relieving the goats of their uncivilized weapons of warfare will be generally adopted.

Mr. Beck dehorns in the fall after all flies are gone.

A different view of the question of dehorning is taken by C. P. Bailey & Sons Co., who dehorned 250 head which were in a band by themselves. They bunted as much or more than before the horns were removed. "Goats always butt each other, but we have never seen any ill effects resulting, except occasionally a leg being broken from being caught between the horns. It deprives them of their only means of defense, and we consider it unnecessary and objectionable."

## SHEARING AND SHEDDING.

## SHEARING ONCE OR TWICE A YEAR.

In Texas, New Mexico, Arizona, and sometimes in California shearing is done twice a year—in the months of March or April and in September or October. The reasons are that, owing to the warm climate, the fleece will often shed in the fall if not clipped. Mr. H. T. Fuchs, of Tiger Mills, Tex., says: "I find it quite necessary to shear twice a year, as they suffer too much from heat in the summer and autumn and even during the warm days in winter if they are not sheared about the middle of September, and in the springtime as soon as they begin to shed their long silky hair." There are instances in these localities where goats carry their fleece through the year, but all breeders, except in some parts of California, report the practice of shearing twice a year. In the other parts of the country shearing is done but once a year, and that in the months of March or April. The rule for shearing time does not depend so much upon the calendar as upon the condition of the fleece. It should not be delayed until the fiber begins to shed, as then the oil will begin to go back into the body of the animal, the mohair thus losing its life and luster.

As to the relative values of the semiannual and annual fleeces, there does not seem to be much difference of opinion. The semiannual fiber is shorter and therefore less desirable for fabricating, and the price is not so high as for that of the annual fleece. It is generally agreed



that the two shearings combined weigh a little more than the annual shearing, but probably the increase does not average more than a quarter of a pound. However, some who have practiced it report that the gain is not equal to the cost of the second shearing, and that shearing twice is done from necessity rather than from the standpoint of profit.

#### USE OF CLIPPING MACHINES.

The use of clipping machines, although largely employed among large sheep raisers, has not yet come into general use among goat raisers. Those who have used them indorse them, and they will no doubt soon come into general use. They are more rapid than hand work, and the results are more satisfactory. The cutting of the skin is easily avoided in reasonably careful hands, while it requires extreme care with hand shears to prevent cutting. Mr. H. I. Kimball, of New Mexico, says of the use of the machines: "I sheared them [the goats] myself faster than the best hand shearer I ever saw, and I got a better price for my mohair." Another gentleman says: "I will say that the clipping machine for sheep will work well on goats in every respect. I have sheared ten goats in one hour and done up the fleeces."

Of course, the goat raiser will consider the relative cost of shearing with machines and by hand before he will purchase a machine. The decision will probably depend upon the number. The cost of hand shearing is about 4 cents a head. In the Southwest there are Mexicans who follow the profession of shearing sheep and goats; these usually receive 2 cents a head with their board. Many of them will shear 85 or 90 a day, the average of all being about 60. Any man who can shear sheep can shear goats. If shearing is done by hand, a short-bladed shear should be used in order to avoid cutting the hair twice.

Another objection to hand shearing is that there is often double cutting of the hair. The result is a shortening of the fiber and an increased amount of noilage.

If the animals are well cared for during the year, their fleece will not require washing before clipping. One writer of experience says that "the natural habits of the Angora goats are clean enough to enable spinning before washing, at least for some purposes." Any dirt that may adhere to the fleece should carefully be picked off after shearing.

#### CARE OF THE FLEECE AFTER SHEARING.

The operation of shearing should be done in a building free from straw and dirt, which might adhere to the fleece after it drops from the goat. It should then be rolled up, inside out, and packed in the sack without being tied in any way. This is the manner in which the mills desire to receive it. The practice of tying the fleece with almost any kind of twine that may be at hand obtains very largely among goat raisers, but the wishes of the mill operators are already receiving

proper attention. The reasons why the mill operators do not desire fleeces tied are very forcibly stated by one of them (George B. Goodall), as follows:

I want to mention another evil which should be corrected, and that is the use of twine or string around the fleeces. Vegetable fibers will not take dyes used for animal fibers, and in cutting these strings by the sorters more or less of the vegetable fibers get into the mohair and have to be carefully burled out from the face of the finished goods, which adds to the cost of each piece. A mohair fleece should be simply rolled up without twine of any description. You never see it on Turkey or Cape mohair.

If mohair producers insist on the use of twine, the quality should be hard and smooth, so that no particle of it will adhere to the mohair when it is cut away.

As to assorting the fleeces with reference to the quality of the mohair, no common practice is followed by producers. Some assort them at shearing time and pack in separate sacks, while others pack all sorts together. If the producer is a good judge of mohair, the former method will prove more satisfactory. When all are packed together indiscriminately, the poorer grades of fiber tend to reduce the average price of the whole lot. However, many prefer to pack thus indiscriminately, leaving the work and judgment of assorting to the commission merchant. Most of the mills purchase from the commission merchant because of his skill in assorting.

There are appended some opinions on this subject of Mr. Hoerle which are worthy of consideration:

Before folding up the fleeces they should be carefully assorted, if this is possible, in the following way:

- A. Combing hair, or all hair over  $4\frac{1}{2}$  inches in length:
  - 1. The very finest, as fine as fine kid hair.
  - 2. Next finest, or average run of good doe fleeces.
  - 3. General run of fair doe and good wether fleeces.
  - 4. Coarse fleeces.
- B. Carding hair, or less than  $4\frac{1}{2}$  inches long:
  - 1. Fineness of class 1 above.
  - 2. Fineness of classes 2 and 3.
  - 3. Coarse fleeces.

At shearing time fleeces of similar quality and length should be packed together, and special care should be taken not to allow tag ends and burrs to remain in the fleeces. The latter should be carefully picked out before the shearing begins and the former pulled off before packing and placed in a special bag, and marked separately. It is much more profitable to have small lots of low-priced short ends and tags and to pull out with the burrs a few strands of the mohair than to have an entire clip depreciated by careless shearing and packing.

#### SHEDDING.

The question of shedding is provoking much discussion among goat raisers at this time. Some maintain that the goats shed regularly, while others assert that the purebreds and best thoroughbreds do not

shed at all. The correspondence of the Bureau shows that practically all of the goats in this country shed their fleece, either annually in the colder localities or semiannually in the warmer climates. The question submitted by the Bureau was, "Do thoroughbreds shed if not sheared?" There were many positive affirmative replies received and several modified answers. Among the latter are reasons why some goats do not shed. It will be of interest, and probably of some profit, to consider some of these replies in any effort toward reaching a conclusion regarding this question, and they are given herewith:

They will all shed in the spring, when warm weather begins, but the higher they are bred up the longer they will go without shedding.—*H. T. Fuchs, Tiger Mills, Tex.*

Some will shed. I regard the nonshedding Angora as a distinct type, and all the various crosses will retain their fleece.—*William L. Black, Fort McKavett, Tex.*

I have goats that never shed, but they are fed for show purposes during winter. If ordinary care is given, they shed.—*Abe Blackburn, North Yamhill, Oreg.*

I have had goats that did not shed at 1 year old, but did at 2. I think feeding conditions are responsible for such cases.—*George A. Houck, Eugene, Oreg.*

Goats of second cross sometimes do not shed. Depends on condition of goat.—*U. S. Grant, Dallas, Oreg.*

Many thoroughbreds will shed, and we have grades that do not. Much depends upon the physical condition of the goat. If it is in poor flesh and fattens rapidly in spring, it is very apt to commence shedding, just as many sheep do under similar conditions.—*W. G. Hughes & Co., Hastings, Tex.*

Though most breeders in this country disagree with me in my nonshedding views, I am supported by the Cape breeders. One of them, Mr. R. C. Holmes, is very decided in his expressions. He says: "With regard to well-bred goats shedding their hair, I quite agree with you that they should not do so. In fact, among my goats it is an exceptional thing to see a goat shed, and even the ewes at kidding time do not shed. At this period some few may do so, but very few indeed, and a ram should never shed." This does not lack in clearness. Angoras will sometimes lose their hair from disease, a change of climate, or a change of weather even, or a sudden change from a continued dry food to green food, etc. This may appear at any time of the year, regardless of the season, and has absolutely nothing to do with the yearly shedding of low-bred goats. No yearly shedder should be classed as a thoroughbred."—*G. A. Hoerle, Ridgewood, N. J.*

Under certain conditions they will shed, but not if the goats are in good health.—*E. A. Hinkle, Roseburg, Oreg.*

I have about fifty head of nannies that do not shed, but most goats shed if not sheared.—*G. M. Scott, Malta, Idaho.*

#### DISEASES AND OTHER ENEMIES.

Goats are less subject to disease than sheep; but these species are so closely allied that treatment in cases of disease is the same for both. Several accounts have been published in the agricultural press of goats in the Southwest being affected with stomach worms and with grub in the head, the same as sheep are affected in the same localities. There are occasionally outbreaks of disease in certain localities, but these are due to local causes, and generally have not been difficult to overcome.

The treatment recommended for the screw worm is as follows: Add to any one of the carbolic sheep dips 10 per cent of chloroform. Apply this mixture, after thoroughly cleaning the wound, with a wad of cotton. The chloroform immediately destroys the larvæ and the carbolic dip prevents the further blowing of the wound.

The stomach worm (*Strongylus contortus*) is the same form as found in sheep, cattle, and deer. The treatment in all cases is the same as for sheep.

Goats have at least three kinds of scab parasites peculiar to their species, but apparently only two kinds of scab develop. Psoroptic scab of sheep does not develop disease upon them, though it can undoubtedly sustain life for a while.

Tapeworms of the genus *Moniezia* are found in goats. In the intestines are also found five round worms, namely, *Strongylus flicollis*, *Oesophagostoma venulosum*, *Sclerostoma hypostomum*, *Uncinaria cerina*, and *Trichocephalus affinis*.

Verminous pneumonia of sheep also occurs in goats.

Tuberculosis is so rare in goats that every case is recorded, the number of such cases being less than a dozen. It may be said, therefore, that they are practically immune from this widespread and insidious disease.

Goats are apt to have foot rot, but a cure is easily effected by the use of sulphate of copper (blue vitriol). It is usually applied by driving the goats through a trough containing a solution of strong blue vitriol. The solution should be about an inch in depth. Oscar Tom, a breeder of much experience, says:

Butter of antimony applied with a stiff feather will cure it, or mix 1 ounce of sulphuric acid with 2 ounces of vinegar and apply as above. Go over the whole band. Generally one application cures if well done. Change the range at the same time if you can.

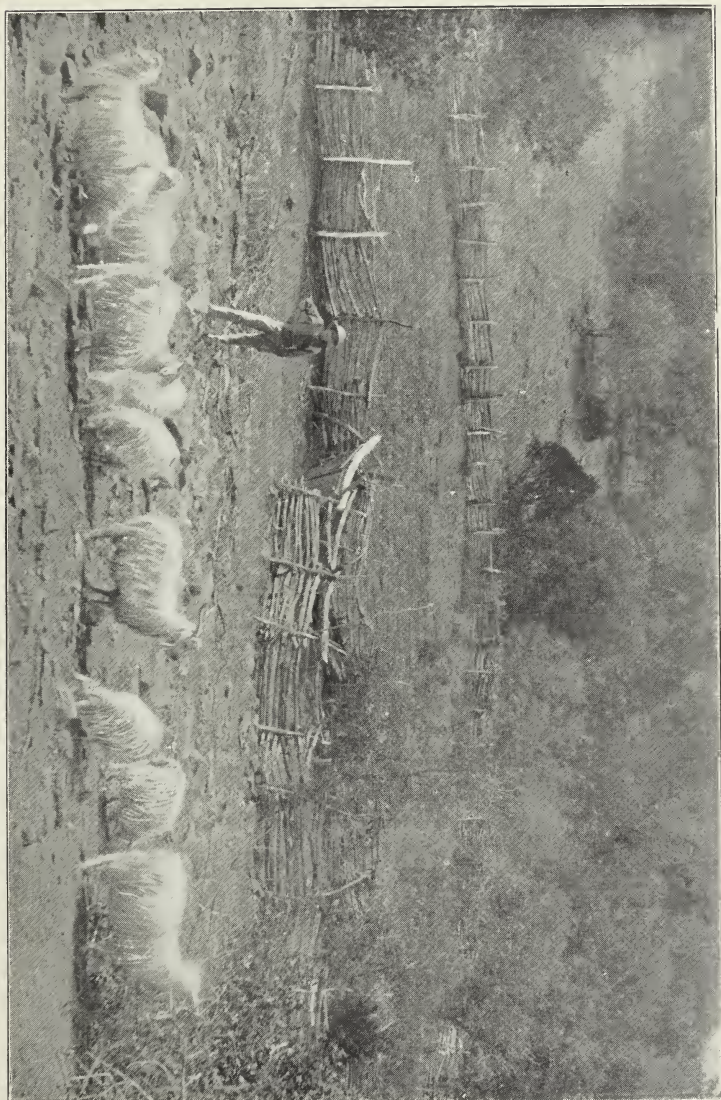
Angoras are frequently affected with lice, which cause a loss of mohair from the rubbing and scratching of the goat. The lice may be exterminated by dipping. The common sheep dips are generally used for the purpose. It is a common practice to dip the goats once a year, and some advise dipping twice a year—in spring just after shearing and again in the fall.

One of the principal enemies of the Angoras is the wolf. The best guard against wolves is a good wire fence. Sometimes the wolves dig under the fence, and then it becomes necessary to trap them. This is practiced by Mr. H. T. Fuchs, who says:

Three steel traps are fastened to each other, but to nothing else, and catch the wolves. If the trap is made fast the wolf will break loose, but the weight of three traps fastened together simply tires the wolf out, and it rarely drags them more than 200 or 300 yards.

In many localities the wildcats are especially troublesome. Their prey is the kids.

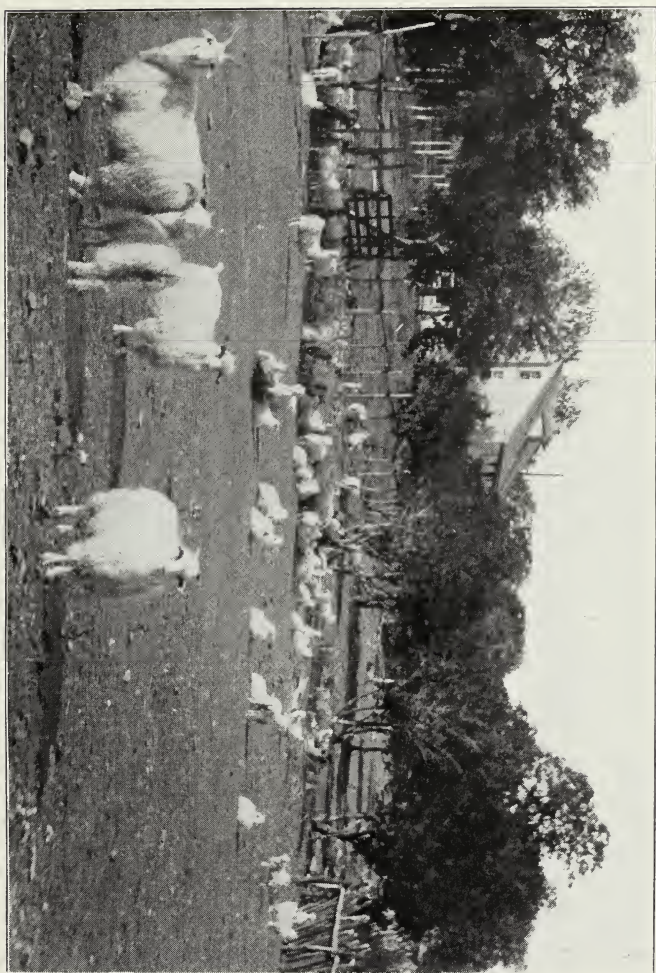




ANGORA GOATS IN PASTURE.

(Photograph furnished by H. T. Fuchs, Tiger Mills, Tex.)





ANGORA GOATS IN YARD.

(Photograph furnished by H. T. Fuchs, Tiger Mills, Tex.)







FIG. 1.—A YEARLING ANGORA GOAT.

(Photograph furnished by W. G. Hughes & Co.)



FIG. 2.—SHEARING ANGORA GOATS.

(Photograph furnished by W. G. Hughes & Co.)



The fact that many plants which are poisonous to sheep and cattle may be eaten with impunity by goats is frequently referred to by writers for the press. It is true, however, that goats sometimes die from eating poisonous plants, especially in the mountainous districts of the Carolinas, as the Bureau is informed through correspondence. The so-called "ground ivy" is specially referred to. It is believed that goats will not eat poisonous plants to an injurious extent unless driven by hunger to do so.

## NUMBER OF ANGORA GOATS.

## IN THE UNITED STATES.

The census reports previous to the year 1900 have not given the number of goats in the United States; the Twelfth Census, however, will show the number of Angoras, as well as the number of common goats.

Col. William M. Black, of Fort McKavett, Tex., in 1898 estimated the total number (including all grades) to be 247,775, located in States and Territories as follows:

Texas .....	75, 000	Tennessee.....	250
California.....	59, 000	South Carolina .....	200
New Mexico .....	52, 000	North Carolina.....	200
Oregon <sup>1</sup> .....	15, 000	Colorado.....	200
Nevada .....	11, 500	Mississippi.....	150
Idaho .....	8, 000	Louisiana .....	150
Wyoming.....	7, 000	Connecticut.....	150
Arizona.....	5, 700	Alabama.....	75
Missouri .....	5, 200	Arkansas .....	75
Utah .....	2, 000	Florida .....	75
Montana.....	1, 500	Iowa .....	75
Kansas .....	1, 200	Virginia .....	75
Indian Territory.....	900	Nebraska .....	50
Georgia.....	750	Washington.....	50
Kentucky.....	500	West Virginia.....	50
Pennsylvania .....	400		
Illinois .....	300	Total .....	247, 775

About a year later Mr. William R. Payne, of New York, estimated the total number at 300,000. If these estimates are anywhere nearly correct, the present number must be very much greater, probably as many as 400,000.

## IN CAPE OF GOOD HOPE.

Mr. W. Hammond Tooke, in the Agricultural Journal of the Cape of Good Hope for May 25, 1899, gives the number of Angora goats for 1893-1898 as follows:

1892-93 .....	2, 811, 206	1895-96 .....	2, 546, 981
1893-94 .....	2, 619, 708	1896-97 .....	2, 685, 080
1894-95 .....	2, 611, 082	1897-98 .....	2, 982, 811

<sup>1</sup> A home authority estimates the Angoras in the State at 65,000.

## IN ANGORA VILAYET.

Schreiner estimated that the number of Angoras in the vilayet of Angora in 1894, was 1,230,000. He also directs attention to the fact that the mohair area of Turkey in Asia extends beyond that province.

## PRODUCTION OF MOHAIR.

The quantity of mohair of all grades produced in the United States has been a matter of guess, and the estimates have been wide apart. Assuming that practically the entire domestic product goes to the mills for fabrication, the Bureau addressed to the mills that consume mohair a request to be furnished a statement of the amount of domestic and imported mohair used annually. It is believed, therefore, that these statistics which are given herewith represent the total product of the United States for the year 1899:

*Consumption of mohair in the United States in 1899.*

Mills.	Domestic.	Imported.
	Pounds.	Pounds.
Sanford Mills and the Goodall Worsted Co., Sanford, Me .....	840,000	460,000
Tingue Manufacturing Co., Seymour, Conn.....		15,000
Atlantic Mills, Providence, R. I.....		<sup>1</sup> 296,465
Gold Medal Braid Co., Attleboro Falls, Mass .....		1,000
Massachusetts Mohair Plush Co., Lowell, Mass.....	200,000	300,000
Westfield Braid Co., Westfield, Mass.....		<sup>1</sup> 8,000
Cranston Worsted Mills, Bristol, R. I.....	32,000	39,000
Queensbury Mills, Worcester, Mass.....	5,000	
Total.....	1,077,000	1,119,465

<sup>1</sup> Not certain it was imported mohair, but assumed to be.

The customs figures of the Cape of Good Hope, as quoted by W. Hammond Tooke, show that mohair was produced there for various years previous to 1898 in the following amounts:

1877 .....	1,433,774	1894 .....	10,003,173
1882 .....	3,766,657	1895 .....	11,090,449
1887 .....	7,153,730	1896 .....	10,001,028
1892 .....	10,516,837	1897 .....	12,583,601
1893 .....	9,457,278		

According to Commercial Relations for 1899 the entire product of the Cape of Good Hope for 1897 was exported, as well as that for 1898, which is given as 10,876,014 pounds.

It has not been possible to obtain figures showing the production of Turkey for any specific year or for a series of years, but the average annual production is frequently given as 7,650,000 pounds.

## TARIFF.

The act approved July 24, 1897, places a duty of 12 cents per pound upon mohair. Mohair cloth for buttons is taxed 10 per cent ad



valorem. The duty on dressed and finished goatskins is 20 per cent ad valorem; on skins for morocco, tanned but unfinished, 10 per cent ad valorem. These rates are subject to increase under certain conditions of shipments.

#### REGISTRATION ASSOCIATIONS.

The Bailey Angora Goat Registration Association, of San Jose, Cal., has kept a private register for many years, and became a general record association in 1898.

There are two registration associations in the United States which were organized during the year 1900—the American Angora Goat Breeders' Association, with headquarters at Kansas City, Mo., and the National Angora Record Association, with headquarters at Salem, Oreg.

#### LITERATURE CONSULTED.

The principal works consulted in the preparation of this paper are as follows:

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The Angora Goat (published under the auspices of the South African Angora Goat Breeders' Association). Longmans Green & Co., London, New York, and Bombay. 1898. Pp. 256, figs. 22.

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The Angora Goat: Its Habits and Culture. Fink & Co., Leon Springs, Tex. 1886. Pp. 32.

JOBSON, E. H.:

Angora Goat Raising. E. H. Jobson, Lake Valley, N. Mex. 1900. Pp. 29, fig. 1.

ALLEN, GEORGE EDWARD:

Angora Goats: The Wealth of the Wilderness. Horace A. Field & Co., Wellsboro, Pa. 1900. Pp. 32, fig. 1.

C. P. BAILEY & SONS CO.:

California Angoras. San Jose, Cal. 1900.

Besides these access has been had to hundreds of articles in the agricultural press. Special mention should be made of the Oregon Agriculturist, Portland, Oreg., the Pacific Rural Press, San Francisco, Cal., and the American Sheep Breeder, Chicago, Ill. The two latter devote a page regularly to the goat industry.

The library force of the Bureau of Animal Industry have prepared a bibliography of goat literature, but the titles are so numerous that it has been deemed advisable to hold them for separate publication rather than to append them here.



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U. S. DEPARTMENT OF AGRICULTURE,  
BUREAU OF ANIMAL INDUSTRY.

D. E. SALMON, D. V. M., Chief.

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LEGISLATION

WITH REFERENCE TO

BOVINE TUBERCULOSIS,

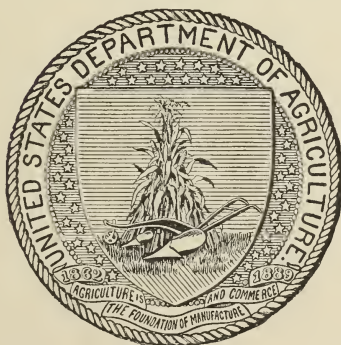
BEING

A DIGEST OF THE LAWS NOW IN FORCE AND A TRANSCRIPT OF THE  
LAWS, RULES AND REGULATIONS, AND PROCLAMATIONS FOR  
THE SEVERAL STATES AND TERRITORIES.

BY

D. E. SALMON, D. V. M.,

Chief of Bureau of Animal Industry.



WASHINGTON:  
GOVERNMENT PRINTING OFFICE.

1901.



## LETTER OF TRANSMITTAL.

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U. S. DEPARTMENT OF AGRICULTURE,

BUREAU OF ANIMAL INDUSTRY,

*Washington, D. C., February 9, 1901.*

SIR: I have the honor to transmit herewith a compilation of the laws and rules and regulations of the several States and Territories, so far as they relate to bovine tuberculosis, and recommend that it be published as Bulletin No. 28 of this Bureau. This information is designed to supply the needs of breeders and shippers of cattle.

Respectfully,

D. E. SALMON,

*Chief of Bureau.*

Hon. JAMES WILSON,

*Secretary of Agriculture.*





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# LEGISLATION RELATIVE TO TUBERCULOSIS.

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## ALABAMA.

Alabama has an old law relative to infectious and contagious diseases which might be construed so as to include tuberculosis of cattle; however, nothing has been done with reference to that disease under this or any other law.

### LAW.

AN ACT for the prevention and suppression of infectious and contagious diseases of horses and other animals. (Approved February 28, 1887.)

SECTION 1. *Be it enacted by the General Assembly of Alabama,* That it shall be the duty of any person, who is the owner or possessor of a horse, mule, or other animal having the glanders, or other fatal contagious or infectious disease, to keep such diseased animal away and removed from any public or other place where horses, mules, or other animals are usually kept in said counties, and also to keep such diseased animals at a distance from any common rendezvous for animals therein, whether such rendezvous or place of resort be maintained for public or private use and conveniences; and any person refusing or wilfully neglecting to obey this provision of law, by bringing such diseased horse, mule, or other animal, or causing the same to be brought, to any rendezvous of animals or other place where the same shall be usually kept, shall be deemed guilty of a misdemeanor, and may be indicted therefor; and upon conviction thereof by or before any court of this State competent at this time to try and punish misdemeanors committed in said counties, shall be fined not exceeding \$50, nor less than \$5, for any violation of this law: *Provided,* That the prosecution and conviction of any person under this statute shall not be a bar to an action for civil damages against said person for loss or injury incurred by reason of the violation thereof.

## ARIZONA.

Arizona has no special law relative to bovine tuberculosis, but the disease is included in the general law of March 1, 1897.

The work against contagious diseases of animals in Arizona is done by the Live Stock Sanitary Board, consisting of three persons appointed by the Governor. The Governor also appoints a Territorial Veterinary Surgeon who operates under the Sanitary Board.

The duty of the board is "to protect the health of the domestic animals of the Territory from contagious and infectious diseases of a malignant character, and for this purpose it is hereby authorized and empowered to establish, maintain, and enforce such quarantine, sanitary, and other regulations, including methods of disinfecting railroad cars, as it may deem necessary."

The Territorial Veterinarian investigates reports of the presence of contagious or infectious diseases, and, if he finds that they do exist, establishes a temporary quarantine and reports the results of his investigations to the board, which establishes a permanent quarantine and prescribes rules and regulations for enforcing it. The proclamation of this quarantine is made by the Governor if the board so recommends.

The veterinarian, with the consent of the board, may slaughter diseased animals after certain conditions shall have been complied with. The slaughter by the veterinarian of animals which have been exposed and do not show disease can be done only with the written consent of the owner and when the order for the same is signed by another veterinarian. There appears to be no provision for indemnity for animals slaughtered.

It is made a misdemeanor to sell, drive, ship, trade, or give away any animals affected with or exposed to any contagious or infectious disease.

Whenever the Live Stock Sanitary Board has reason to believe that such diseases exist in other States or Territories, it reports the fact to the Governor, who issues a proclamation of quarantine against those districts, prohibiting the importation from them of any live stock of the kind diseased unless accompanied by a certificate of health. An exception is made of cattle in transit through the Territory by railroad and not unloaded.

It is also made a misdemeanor to bring into the Territory any animal which is affected with or has been exposed to any contagious or infectious disease.

#### LAW.

AN ACT to codify and revise the laws with reference to live stock.

*Be it enacted by the Legislative Assembly of the Territory of Arizona:*

SECTION 1. Three commissioners identified with the live stock interests of the Territory of Arizona shall be appointed by the Governor, with the advice and consent of the legislative council, who shall constitute the Live Stock Sanitary Board of the Territory of Arizona. Before entering upon the duties of his office each commissioner shall take and subscribe the oath of office according to law, and file the same with the Secretary of the Territory; and each commissioner before entering upon the performance of his duties shall execute a bond, to be approved by the Governor, in the sum of \$2,000, conditioned that he will faithfully perform the duties of his office, and file the same with the Secretary of the Territory. The term of office of the first commissioner named by the Governor shall be for three years from the 1st day of April, 1897; the second one named shall be for two years, and the third one named shall be for one year from said 1st day of April, 1897, and the successors of each shall be appointed for the term of three years thereafter. The Governor shall have the power to fill vacancies in said board. Said board shall elect one of their number chairman. The board shall keep a full and complete record of their proceedings and make such report to the Governor as may from time to time be required, and a biennial report to the legislative assembly. The members of the board appointed by the Governor as hereinbefore provided shall receive \$5 per day for the time by them necessarily employed in discharging



the duties required by this act: *Provided, however,* That in no one year shall the board be in session more than sixty days, except upon call of the Governor, and each member of the board shall receive 10 cents for each and every mile actually traveled, which per diem and mileage shall be paid on the warrant of the Auditor, to be issued on the filing in the Auditor's office of an itemized account thereof, properly certified thereto by such member, duly countersigned by the Secretary, with the seal of the board and approval of its chairman.

SEC. 2. The Governor shall nominate, and by and with the advice and consent of the legislative council appoint, a skilled veterinary surgeon for the Territory of Arizona, who at the date of such appointment shall be a graduate in good standing of a recognized college of veterinary surgeons, and who shall hold his office for the term of two years, unless sooner removed by the board; the salary of said veterinary surgeon shall be the sum of \$1,200 per annum and 10 cents per mile for each mile actually and necessarily traveled in the discharge of his duties. Before entering upon the discharge of his duties the Territorial Veterinarian shall take and subscribe an oath to faithfully perform the duties of his said office and shall execute a bond to the Territory of Arizona in the sum of \$5,000, with good and sufficient sureties, conditioned for the faithful performance of the duties of his office, which bond and sureties thereto shall be approved by the Governor, and said bond, together with the oath of office, shall be deposited in the office of the Secretary of the Territory.

SEC. 3. It shall be the duty of any owner or person in charge of any domestic animal or animals who discovers, suspects, or has reason to believe that any of his domestic animals, or domestic animals in his charge, are affected with any infectious or contagious disease to immediately notify such fact, belief, or suspicion to the board or any member of it or to the Territorial Veterinarian; and it shall be the duty of any person who discovers the existence of any contagious or infectious disease among the domestic animals of another to report the same to the said board or Territorial Veterinarian, and any attempt to conceal the existence of such disease, or to wilfully or maliciously obstruct or resist the said board or the Territorial Veterinarian in the discharge of their duties as herein set forth, shall be deemed a misdemeanor.

SEC. 4. It shall be the duty of the board provided for in the first section of this act to protect the health of the domestic animals of the Territory from the contagious and infectious disease of a malignant character, and for this purpose it is hereby authorized and empowered to establish, maintain, and enforce such quarantine, sanitary, and other regulations, including methods of disinfecting railroad cars, as it may deem necessary. It shall be the duty of any member of said board, upon receipt by him of reliable information of the existence among the domestic animals of the Territory of any malignant disease, to immediately notify the Territorial Veterinarian, who shall go at once to the place where any such disease is alleged to exist and make a careful examination of the animals believed to be affected with any such disease, and ascertain, if possible, what, if any, disease exists among the live stock reported to be affected and whether the same is contagious or infectious or not; and if said disease is found to be of a malignant, contagious, or infectious character, he shall direct a temporary quarantine and sanitary regulations necessary to prevent the spread of any such disease and report forthwith his findings and actions to the chairman of the board.

SEC. 5. Upon the receipt by the chairman of the board of the report of the Territorial Veterinarian provided for in Section 4 of this act, he shall immediately, if the exigencies of the case require it, convene the board at the most convenient place; and if upon consideration of the report of the veterinarian the board shall be satisfied that any contagious or infectious disease exist which seriously affects the health of domestic animals, they shall, after ascertaining and determining the extent of premises or grounds infected, authorize the veterinarian to establish the

quarantine, sanitary, and police regulations necessary to circumscribe and exterminate such disease: and no domestic animal liable to become infected with the disease or capable of communicating the same shall be permitted to leave the district, premises, or grounds so quarantined except by the authority of the veterinarian. The said board shall prescribe such rules and regulations as will enable the veterinarian to perfectly isolate the diseased and exposed animals from all other domestic animals which are susceptible of becoming infected with disease; they shall also, from time to time, prescribe and enforce such directions, rules, and regulations as to separating, mode of handling, treating, feeding, and caring for such infected or diseased and exposed animals as it shall deem necessary to prevent the two classes of animals from coming in contact with each other; and the said board or any of the members thereof, or said veterinarian, are hereby authorized and empowered to enter upon any grounds or premises to carry out the provisions of this act.

SEC. 6. When the said board shall have determined the quarantine and other regulations necessary to prevent the spread among domestic animals of any malignant, contagious, or infectious disease found to exist among the live stock of the Territory, and given the orders as hereinbefore provided prescribing quarantine and other regulations, it shall notify the Governor thereof, who shall issue his proclamation proclaiming the boundary of such quarantine and the orders, rules, and regulations prescribed by the board, which proclamation may be published by written or printed handbills posted within the boundaries or on the lines of the district, premises, places, or grounds so quarantined, or by being published in the stock papers of the Territory: *Provided*, That if the board decides that it is not necessary, by reason of the limited extent of the district in which such disease exists, that a proclamation should be issued, then none shall be issued, but the board shall give notice as may to it seem best to make the quarantine established effective.

SEC. 7. In any case of epidemic disease where premises have been previously quarantined by the Territorial Veterinarian, as before provided, he is further authorized and empowered, when in his judgment necessary, by and with the consent of the board, to order the slaughter of any or of all diseased animals upon said premises and of all animals that have been exposed to contagion or infection, under the following restrictions: The order for slaughter shall be in writing and shall be made in duplicate, and there shall be a distinct order and a duplicate for each owner of the animal or animals condemned, the original of each order to be filed in the office of the said board and the duplicate given to the said owner. And, further, before slaughtering any animal or animals that have been exposed only and do not show disease the veterinarian shall call in consultation with him two reputable practicing veterinarians or physicians, residents of the Territory, or if this is impracticable, then two reputable and well-known stock owners, residents of the Territory, and shall have the written indorsement upon his orders of at least one of said consulting physicians or stock owners, stating that the said action is necessary, and the consent in writing of the owner or person in charge before such animal or animals shall be slaughtered. It shall be the duty of the Territorial Veterinarian to superintend the slaughtering of such animals as may be condemned, and also the destruction of the carcass, causing the same to be destroyed as cheaply as practicable, which destruction shall be by burning to ashes, and shall include every part of the animal and hide and also excrement and stable bedding or corral litter as far as possible.

SEC. 8. Any person, persons, firm, or corporation who shall have in his possession any domestic animal affected with any contagious or infectious disease, knowing such animal to be so affected, or after having received notice that such animal is so affected, who shall sell, drive, ship, trade, or give away such diseased animal or animals which have been exposed to such infection or contagion, sheep infected with scab upon the range excepted, or who shall move or drive any domestic

animal in violation of any direction, rule, regulation, or order establishing and regulating quarantines, shall be deemed guilty of a misdemeanor: *Provided*, That any owner of any domestic animal which has been affected with or exposed to any contagious or infectious disease may dispose of the same after having obtained from the Territorial Veterinarian a bill of health of such animal. It shall be unlawful to kill for butcher purposes any diseased animal, to sell, give away, or use any part of it or its milk, or to remove any part of the skin.

SEC. 9. Whenever the said board shall have good reason to believe that any contagious or infectious disease exists in any other State, Territory, or countries, or that there are conditions that render domestic animals from such districts liable to convey such disease, they shall report the same to the Governor. Thereupon the Governor shall, by proclamation, prohibit the importation of any live stock of the kind diseased into the Territory, unless accompanied with a certificate of health given by a duly authorized State or Territorial Veterinarian, and all such animals arriving in this Territory shall be examined upon arrival by the Territorial Veterinary Surgeon, and if deemed necessary placed in close quarantine until all danger of infection is passed, when they shall be released by order of the Territorial Veterinarian. All expense connected with such examination shall be paid by the owner or owners of such stock.

SEC. 10. It shall be unlawful for any person, persons, firm, or corporation to drive or transport, or cause to be driven or transported, into the Territory of Arizona any live stock from those States, Territories, or countries against which the Governor has proclaimed a quarantine, as hereby provided for in Section 9 of this act: *Provided*, That cattle in transit through the Territory on a railroad, when not unloaded, are not liable to any penalties attached to this act. Otherwise the regulations contained herein shall apply as well to those animals in transit through the Territory as to those resident therein, and the said board, a member thereof, or the Territorial Veterinary Surgeon shall have full authority to examine, whether in yards, or pasture, or stables, or upon the public domain, all animals passing through the Territory or any part of it, and on detection or suspicion of disease to take possession of and treat and dispose of said animals in the same manner as is prescribed for animals resident in the Territory.

SEC. 11. Any person, persons, firm, corporation, owner, or agent who shall knowingly bring into this Territory any domestic animal or animals affected with any contagious or infectious disease, or any animal or animals which have been exposed to any contagious or infectious disease, shall be deemed guilty of a misdemeanor.

SEC. 12. Except as otherwise provided in this act, any person, persons, firm, corporation, owner, or agent who shall violate, disregard, or evade, or attempt to violate, disregard, or evade any of the provisions of this act, or who shall violate, disregard, or evade, or attempt to violate, disregard, or evade any of the rules, regulations, orders, or directions of the said board establishing and governing quarantine, shall be deemed guilty of a misdemeanor; and any person, persons, firm, corporation, owner, or agent who violates any of the provisions of this or of Sections 3, 5, 8, or 11 of this act shall be guilty of a misdemeanor, and upon conviction thereof in any court of competent jurisdiction shall be fined not less than \$50 nor more than \$300 and shall be liable for any damages that may be sustained by reason of their failure to comply with the provisions of the said sections.

\* \* \* \* \*

#### REGULATIONS.

Paragraphs 1, 2, and 4 of the regulations issued by the Live Stock Sanitary Board on May 1, 1900, are applicable to tuberculosis as one of the contagious diseases, and they are given herewith:

First. All persons desirous of shipping or driving live stock of any class into or through the Territory of Arizona should secure a certificate of health for the



same from the State or county veterinarian where they originate, declaring that said animals are free from all contagious and infectious diseases, and a copy of said health certificate should be sent to the Secretary of the Board or Territorial Veterinarian as early as possible.

Second. It shall be the duty of all transportation companies before entering the Territory with any live stock to inform the Sanitary Board, through its Secretary or Territorial Veterinarian at Phoenix, stating:

(a) Name of the shipper. (b) Place from which the stock originated. (c) Destination of stock. (d) Whether or not shipment is accompanied by certificate of health, and, if so, by whom signed.

Should they originate in a healthy district, they will be admitted if accompanied by proper health certificate (according to Rule 1).

Should the stock originate in an infected district which would render them liable to communicate an infectious or contagious disease, the Territorial Veterinarian shall place them in quarantine until all danger of infection is passed.

Fourth. When application is made for the admission of live stock into the Territory of Arizona, not accompanied by proper health certificate, the Territorial Veterinarian may inspect said stock at point of entry into the Territory of Arizona before issuing such permit, and the owner of said stock shall pay the Territorial Veterinarian his legal mileage and per diem while making such inspection.

## ARKANSAS.

There is no law relative to bovine tuberculosis in Arkansas.

## CALIFORNIA.

California has a general law against contagious or infectious diseases of domestic animals which in a general sense includes tuberculosis. This law provides that the owners of diseased animals shall keep them isolated from other animals of the same species and shall not drive them upon a public highway or onto a range where they will come in contact with other animals of like species not so affected.

### LAW.

AN ACT to prevent the spread of contagious or infectious diseases among domestic animals.  
(Approved March 23, 1893.)

*The people of the State of California, represented in Senate and Assembly, do enact as follows:*

SECTION 1. Any person or persons, company, or corporation, owning or having possession or control of any animal affected by any contagious or infectious disease, who shall fail to keep the same within an inclosure, or herd the same in some place where they will be secure from contact with other animals of like kind not so affected, or who shall suffer such infected animals to be driven on the public highway or to range where they will be likely to come in contact with other animals not so affected, shall be guilty of a misdemeanor, and, on conviction, punished by a fine of not more than \$500 for each offense.

SEC. 2. This act shall take effect immediately.

## COLORADO.

Colorado has no law relative to bovine tuberculosis.



## CONNECTICUT.

Dr. C. A. Lindsley, Secretary of the Connecticut State Board of Health, says: "There were a number of laws relating to tuberculosis in cattle. In 1895 some additional legislation was enacted which was somewhat in advance of public sentiment, and in 1897 every law on the subject was repealed excepting one forbidding the sale of milk from any cows that were known to be tuberculous."

The section (General Statutes, 1888) not repealed is as follows:

SEC. 2664. Any person who shall knowingly sell or expose for sale milk, or any product of milk, from any cow which shall have been adjudged by the Commission upon Diseases of Domestic Animals affected with tuberculosis or other blood disease, shall be fined not more than \$7 or imprisoned not more than thirty days, or both.

## DELAWARE.

No special law relating to bovine tuberculosis is on the statutes of Delaware; the disease is embraced in the general act of May 4, 1893, providing for the eradication of infectious and contagious diseases among domestic animals.

The Governor of the State is authorized to issue a proclamation, when necessary, stating that an infectious or contagious disease exists in the State, naming the locality, and warning all persons to seclude their animals of the kind diseased and to take the necessary precautions to prevent the spread of the disease.

Animals coming into the State may be detained for inspection and examination. The Governor may prescribe regulations for the destruction of animals affected with a contagious or infectious disease; no animal shall be destroyed, however, until examined by a veterinarian in the employ of the Governor. No provision is made for indemnifying the owners of animals killed on account of being diseased.

## LAW.

(CHAPTER 639, VOL. 19, LAWS OF DELAWARE.)

AN ACT for the eradication of infectious and contagious diseases among the lower animals.  
(Passed at Dover, May 4, 1893.)

SECTION 1. That in order to protect the lives and property of citizens of Delaware when threatened by epidemics of contagious and infectious diseases among the lower animals, authority is hereby vested in the Governor of this State to issue his proclamation stating that an infectious or contagious disease exists in any county or geographical district of the State, and warning all persons to seclude, in the premises where they may be at the time, all animals within the quarantined district that are of a kind susceptible to contract the disease in question, and ordering all persons to take such precautions against the spread of such disease as the nature thereof may in his judgment render necessary or expedient.

SEC. 2. To call upon all sheriffs and deputy sheriffs to carry out and enforce the provisions of such proclamations, orders, and regulations; and it shall be the duty of all sheriffs and deputy sheriffs to obey and observe all orders and instructions which they may receive from the Governor in the premises.

SEC. 3. To employ such and so many medical and veterinary practitioners and such other persons as he may from time to time deem necessary to assist in performing his duties, as set forth in the first section of this act, and to fix their compensation.

SEC. 4. To order all or any animals coming into the State to be detained at any place or places for the purpose of inspection and examination.

SEC. 5. To prescribe regulations for the destruction of animals affected with infectious or contagious disease, and for the proper disposition of their hides and carcasses, and of all objects which might convey infection or contagion: *Provided*, That no animal shall be destroyed until first examined by a medical or veterinary practitioner in the employ of the Governor as aforesaid.

SEC. 6. To prescribe regulations for the disinfection of all premises, buildings, boats, and railway cars, and of all objects from or by which infection or contagion may take place or be conveyed.

SEC. 7. To take such action in regard to exposed carcasses, bones, etc., and to graves of lower animals known to have died from diseases directly communicable in a fatal form to man as he, after consultation with well-informed persons, may deem to be expedient.

SEC. 8. To alter and modify, from time to time, as he may deem expedient, the terms of all such proclamations, orders, and regulations, and to cancel and withdraw the same at any time.

SEC. 9. For the purpose of defraying the expenses involved in carrying out the provisions of this act an annual appropriation, not to exceed \$500, or so much thereof as occasion may require, is hereby made from the funds of this State.

#### DISTRICT OF COLUMBIA.

The eighth section of the act creating the Bureau of Animal Industry requires the Commissioners of the District of Columbia to take measures for the prompt suppression of all contagious, infectious, and communicable diseases affecting domestic animals and to prescribe regulations to prevent infection and contagion.

Owners of animals affected with or supposed to be affected with any such disease are required to isolate them and forthwith report the facts to the Chief of the Bureau of Animal Industry, and to follow such directions as said chief may prescribe.

All veterinary surgeons of the District and all members of the police force are required to inquire into and report upon known or suspected cases of such diseases.

The Chief of the Bureau only has authority to order the killing of any animal affected with a contagious or infectious disease; he also has power to quarantine premises.

#### LAW.

REGULATION for the suppression and prevention of contagious, infectious, and communicable diseases affecting domestic animals in the District of Columbia.

OFFICE OF THE COMMISSIONERS OF THE DISTRICT OF COLUMBIA,

*Washington, August 21, 1888.*

Whereas the eighth section of the act of Congress approved May 29, 1884, entitled "An act for the establishment of a Bureau of Animal Industry, to prevent the exportation of diseased cattle, and to provide the means for the suppression and

extirpation of pleuropneumonia and other contagious diseases among domestic animals," authorizes and requires the Commissioners to take measures for the prompt suppression of all contagious, infectious, and communicable diseases affecting domestic animals in the District of Columbia, to prescribe regulations for disinfection, and such other regulations as they may deem necessary to prevent infection and contagion, as provided in said section, do ordain, declare, and publish the following:

*Ordered*, That all persons having the care or custody of any domestic animal in the District of Columbia affected or supposed to be affected with any infectious, contagious, or communicable disease shall isolate and forthwith report the same to the Chief of the Bureau of Animal Industry of the Department of Agriculture, or to some officer in said Bureau in said District, designating the place where the same may be found, and shall place the same at his disposal and observe and follow such directions as such chief or officer shall prescribe in such case.

2. That it is hereby made the duty of all veterinary surgeons in said District and sanitary inspectors of the health department of the District, and of every member of the Metropolitan police force, to inquire and report upon all known or suspected cases referred to in Section 1 of this order.

3. That if any person or persons having the care or custody of any domestic animal in said District, affected or supposed to be affected as aforesaid, shall secrete or conceal the same, or use any device to conceal the same, or mislead the persons or officers who are charged with any duty with reference to such domestic animals, and all persons aiding therein, shall each suffer the penalty hereinafter described.

4. That the Chief of the Bureau of Animal Industry only may cause the death of any so diseased, or supposed to be diseased, animal in said District upon order, oral or written, from him for the death of such animal, and shall also prescribe the mode and place of such death, which shall be strictly pursued in the destruction of said animal, and the bodies of such animals so killed shall be removed by the health officer of the District upon notice from said chief.

5. That every person who shall violate any of the provisions of this regulation shall be fined in any sum not less than \$10 nor more than \$25 for each offense, to be enforced in the police court of the District of Columbia in the name of the District on information, etc.

The Commissioners having learned that a dangerous communicable disease prevails among domestic animals in the vicinity of the district which by contagion or transportation may affect the general health and safety, the Commissioners, in pursuance of the provisions of Section 8 of the act approved May 29, 1884, order the following measures for the prompt suppression of the same:

1. Upon the recommendation of the Commissioner of Agriculture, the Chief of the Bureau of Animal Industry in the United States Department of Agriculture is hereby authorized and empowered to act as veterinarian for the District of Columbia for the purposes named in the act above quoted.

2. So much of the rules and regulations prepared by the Commissioner of Agriculture in accordance with the requirements of the act aforesaid, and published under date of April 15, 1887, as are applicable to the District of Columbia are hereby approved and adopted by the Commissioners as regulations for the District: *Provided*, That wherever said regulations require report and action by the Commissioner of Agriculture, the Chief of the Bureau of Animal Industry, acting as veterinarian for the District, shall submit the requisite reports and recommendations for the consideration of and action by the Commissioners of the District of Columbia.

3. The legally appointed agents and inspectors of the Bureau of Animal Industry are hereby empowered, under the direction of the Chief of the Bureau, to discharge corresponding duties for the District of Columbia, and all citizens of the

District are hereby directed and required to recognize and respect the said Chief of the Bureau of Animal Industry and his duly appointed agents as lawful officers of the District.

4. The said Chief of the Bureau and his agents are authorized to inspect any premises in the District of Columbia where it is believed there exists any contagious, infectious, or communicable disease among any domestic animals, and if found needful to order the temporary quarantine of said animals, to cause premises to be disinfected, and if necessary to condemn the animals to be killed in order to prevent the spread of the disease.

5. The proceedings for the appraisal of the value of animals condemned to be killed shall be under the provisions of Section 8 of the regulations.

6. The Chief of the Bureau aforesaid, acting as veterinarian for the District, shall make to the Commissioners monthly reports of all matters relating to the subject of this order within the District of Columbia, and in addition thereto special reports and recommendations as often as shall be needful for the information of the Commissioners to enable them to carry into effect the provisions of the law.

### FLORIDA.

Florida has no law relative to bovine tuberculosis.

### GEORGIA.

Georgia has no law relating to bovine tuberculosis.

### IDAHO.

Idaho has no legislation with reference to bovine tuberculosis.

### ILLINOIS.

The law provides for the appointment by the Governor of three practical stock breeders, who shall constitute a Board of Live Stock Commissioners.

The duties of said board shall be to investigate all cases of contagious or infectious diseases coming to their knowledge and, so far as possible, to prevent their spread and provide for their extirpation. Owners of animals so diseased must notify the board, and the board may quarantine.

The board has power to slaughter diseased or exposed animals; to destroy or quarantine all barns, stables, premises, fixtures, etc.; to allow indemnity for slaughtered animals upon agreement or appraisement.

Claims for indemnity for animals slaughtered are made to the board, who shall determine the amount of indemnity, the maximum payment not to exceed \$75 for bovine species.

The Governor shall appoint a State Veterinarian, who shall operate under the direction of the board, and who may appoint assistants.

He may also issue proclamation prohibiting entry into the State of diseased animals, except under prescribed regulations, and transpor-



tation corporations which violate such regulations are subject to a fine of not less than \$1,000 nor more than \$10,000 for each offense.

No person knowing of the existence of contagious or infectious disease among his animals shall conceal such fact; he shall not sell such diseased or exposed animals or remove them from his premises except by order of the board; he shall not import any such animals from another State, or in any way engage in traffic of such animals. The penalty for such violation of these provisions is not less than \$25 nor more than \$200, and imprisonment in county jail until fine and costs are paid for each offense; and he forfeits all right to indemnity.

The sum of \$20,000 is appropriated to pay for property destroyed and for disinfection, and \$5,000 for tuberculin tests and for indemnity for animals responding to the tuberculin test.

#### LAWS.

AN ACT to Revise the law in relation to the suppression and prevention of the spread of contagious and infectious diseases among domestic animals, approved June 27, 1885, in force July 1, 1885, as amended by an act approved and in force April 20, 1887, and an act approved June 15, 1887, in force July 1, 1887.

*Be it enacted by the People of the State of Illinois, represented in the General Assembly:*

SECTION 1. That the Governor shall, with the advice and consent of the Senate, appoint three practical stock breeders, not more than two of whom shall be members of the same political party, who shall constitute a Board of Live Stock Commissioners, who shall hold their office in the order in which they are named, the first for one year, the second for two years, and the third for three years; and their successors in office shall be appointed for three years each. Before entering on the duties of their office they shall take and subscribe to an oath of office for the faithful performance of their duties as such commissioners, and shall file the same with the Governor.

SEC. 2. It shall be the duty of said Board of Commissioners to cause to be investigated any and all cases, or alleged cases, coming to their knowledge of contagious and infectious diseases among domestic animals, and to use all proper means to prevent the spread of such diseases and to provide for the extirpation thereof; and in the event of reasonable ground for belief that any such contagious or infectious disease has broken out in this State, it shall be the duty of the person owning or having in charge any animal or animals infected with disease, or any other person having knowledge or reason to suspect the existence of such disease, to immediately notify said Board of Commissioners, or some member thereof, by communication to said board, of the existence of such disease; and thereupon it shall be the duty of said board, or some member thereof, or authorized agent of the board, immediately to cause proper examination thereof to be made, and if said disease shall be found to be a dangerously contagious or dangerously infectious malady, said board or any member thereof, or the State Veterinarian or any Assistant Veterinarian, shall order said diseased animals, and such as have been exposed to contagion, and the premises in which they are, to be strictly quarantined for such time as the board, or any member thereof, or such veterinarian may deem necessary, in charge of such person as the board, or any member thereof, or such veterinarian, shall designate, and they shall have power to order any premises and farms where the disease exists, or has recently existed, as well as exposed premises and farms, to be put in quarantine, so that no domestic animal which has been or

is so diseased, or has been exposed to such contagious or infectious disease, be removed from the places so quarantined, nor allow any healthy animal to be brought therein, except under such rule or regulation as the said board may prescribe; and said board shall prescribe such regulations as they may deem necessary to prevent such disease from being communicated in any way from places quarantined. In all such cases of contagious and infectious disease, the said board, or, in case the number of animals shall not exceed five, any member thereof, shall have power to order the slaughter of all such diseased and exposed animals. The said board shall have power to cause to be destroyed all barns, stables, premises, fixtures, furniture, and personal property infected with any such contagious or infectious disease, so far as in their judgment may be necessary to prevent the spread of such disease, and where the same can not be properly disinfected. When the board, upon the written report of the State Veterinarian, or any of his assistants, determine that any animal is affected with, or has been exposed to, any dangerously contagious or infectious disease, the board, or any member thereof, may agree with the owner upon the value of such animal or property, and in case such agreement can not be made, said board, or the member acting in behalf of the board, may appoint three disinterested citizens of the State to appraise such diseased animal or exposed animals or property. Such appraisers shall subscribe to an oath in writing to fairly value such animal in accordance with the requirements of the act, which oath, together with the valuation fixed by said appraisers, shall be filed with the board and be preserved by them. Upon such appraisement being made, it shall become the duty of the owner to immediately destroy such animal and dispose of the same in accordance with the order of said board, or member thereof, and upon failure so to do said board, or any member thereof, shall cause such animal or animals or property to be destroyed and disposed of, and thereupon the said owner shall forfeit all right to receive the compensation allowed by said appraisers and provided for by this act. When the board, upon the written opinion of the State Veterinarian, determines that any barns, stables, outbuildings, or premises are so infected that the same can not be disinfected, they may quarantine such barns, stables, outbuildings or premises from use for the animals that may be infected by such use, and such quarantine shall continue until removed by the board, and a violation of such quarantine shall be punished as is provided for violations of other quarantine by this act.

SEC. 3. The Governor shall appoint a competent veterinary surgeon, who shall be known as the State Veterinarian, who, together with his assistants, shall act under the direction of said board in carrying out the provisions of this act. In the event of the inability of the said State Veterinarian to perform all the work which he may be directed to do by the said Board of Commissioners, he may, by and with the advice and consent of said board, appoint such other necessary assistant veterinarians upon terms not exceeding that paid the State Veterinarian. The State Veterinarian shall receive for his services the sum of \$3 per day, for each day actually employed under the provisions of this act, together with his necessary expenses, to be certified to by said Board of Commissioners.

SEC. 4. Whenever said Board of Commissioners shall report to the Governor that such diseases have become epidemic in certain localities in other States, or that their condition would render such domestic animals liable to convey such disease, he may, by proclamation, schedule such localities, and prohibit the importation of any live stock of the kind diseased into the State, except under such regulations as may be prescribed by the said board and approved by the Governor. Any corporation which shall knowingly transport, receive, or convey prohibited stock, shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be fined not less than \$1,000 nor more than \$10,000 for each and every offense, and shall become liable for any and all damage or loss that may be sustained by any party or parties by reason of such importation or transportation of such prohibited

stock. Such penalty shall be recovered in any county in this State into or through which stock is brought, upon information filed in the circuit or county court of any such county, or of the Superior court of Cook County. Any person who, knowing that any contagious or infectious disease exists among his domestic animals, shall conceal such fact, or knowing of the existence of such disease shall sell the animal or animals so diseased, or any exposed animal, or knowing the same, shall remove such diseased or infected animals from his premises to the premises of another, or knowing of the existence of such disease or exposure, shall drive or lead or ship the same by any car or steamboat to any other place in or out of this State, and any person or persons who shall bring any such diseased, or knowingly, shall bring any such exposed animal or animals into this State from another State, and any person or persons who shall knowingly, buy, receive, sell, convey, or engage in the traffic of such diseased or exposed stock, and any person who shall violate any quarantine regulations established under the provisions of this act, shall, for each, either, any, and all acts above mentioned in this section be guilty of a misdemeanor and, on conviction thereof, or of any said acts, shall be fined in any sum not less than \$25 nor more than \$200, and imprisonment in the county jail until the fine and costs are paid, and shall forfeit all right to the compensation for any animal or property destroyed under the provisions of this act. Any veterinary practitioner having information of any contagious or infectious disease in this State, and who shall fail to promptly report such knowledge to the Board of Live Stock Commissioners, shall be fined not exceeding \$500, or be imprisoned in the county jail not more than one year for each offense.

SEC. 5. Whenever said board shall become satisfied that any dangerously contagious or infectious disease among domestic animals exists throughout any municipality or geographical district within this State, and, in their judgment, it is necessary to quarantine such municipality or geographical district in order to prevent the spread of such disease into contiguous territory, they shall report the same to the Governor, who may thereupon by proclamation schedule and quarantine such district, prohibiting all domestic animals of the kind diseased within such district from being removed from one premises to another or over any public highway or any unfenced lot or piece of ground, or from being brought into or taken from such infected district, except upon obtaining a special permit, signed by the Board of Live Stock Commissioners, or members thereof, or agents or officer of the board duly authorized by it to issue such permits; and such proclamation shall from the time of its publication bind all persons. After the publication of aforesaid proclamation, it shall be the duty of every person who owns or is in charge of animals of the kind diseased within the scheduled district to report to said board within one week the number and description of such animals, location, and the name and address of the owner, and during the continuance of such quarantine to report to said board all cases of sickness, deaths, or births among such animals. It shall also be the duty of any and all persons within the scheduled district receiving and purchasing cattle for slaughter to delay the killing of such animals until a veterinary surgeon with authority from said board is present to make a postmortem examination of the carcasses. Any violation of the aforesaid quarantine regulations and duties shall be visited with like penalties, which may be recovered in like manner as is provided for the violation of other quarantine as provided in Section 4 of this act: *Provided*, That nothing contained in this section shall be so construed as to prevent the movement of any animals of the kind diseased through such territory under such regulations as the Board of Live Stock Commissioners may prescribe, and the Governor approve: *And provided further*, That all cattle within the scheduled district slaughtered by order of the board shall not be taken from said district for slaughter.

SEC. 6. Nothing contained in this act, or any section thereof, shall be interpreted so as to prevent the removal or shipment of diseased or exposed animals, under the



orders of the board created by this act, from one place to another by said board or its agents, by driving along the public highway or shipment on cars or steamboats, when, in the opinion of said board, such removal is necessary for the suppression of such contagious or infectious disease.

SEC. 7. Whenever quarantine is established in accordance with the provisions of Section 2 of this act, valid notice of the same may be given by leaving with the owner or occupant of any premises in person, or delivering to any member of his family, or any employee over the age of 10 years found on the premises so quarantined, notice thereof, written or printed, or partly written and partly printed, and, at the same time, explaining the contents thereof. Such quarantine shall be sufficiently proven in any court by the production of a true copy of such notice of quarantine, with a return thereon of the service of the same in the manner above required. Any person violating said quarantine shall be guilty of a misdemeanor and punished as is provided in Section 4 of this act, and on conviction shall be liable for all damage that may result to other persons in consequence of such violation: *Provided*, That anyone feeling himself aggrieved by such quarantine may appeal to the full Board of Commissioners, who shall thereupon sustain, modify, or annul said quarantine as they deem proper.

SEC. 8. All fines recovered under the provisions of this act shall be paid into the county treasury of the county in which the suit is tried by the person collecting the same in the manner now provided by law, to be used for county purposes; and it shall be the duty of State's attorneys in their respective counties to prosecute for all violations of this act.

SEC. 9. All claims against the State arising from the slaughter of animals, as herein provided for, shall be made to said Board of Commissioners, under such rules and regulations as they may prescribe, and it shall be the duty of said Board of Commissioners to determine the amount which shall be paid in each case on account of animals so slaughtered, which, in case of animals of the bovine species, shall be based on the fair cash market value thereof for beef, or for use for dairy purposes, not to exceed \$75 per head, and, in cases of animals of the equine species, on their fair cash market value, not to exceed \$100 per head, and report the same to the Governor; and the Governor shall indorse thereon his order to the State Auditor, who shall thereupon issue his warrant on the State Treasurer for the same.

SEC. 10. Said Board of Commissioners, or any member thereof, and the State Veterinarian and his assistants, in the performance of their duties under this act, shall have power to call on sheriffs and their deputies, constables, and peace officers, mayors of cities, city and town marshals and policemen to assist them in carrying out its provisions, and it is hereby made the duty of all such officers to assist in carrying out the provisions of this act when ordered so to do; and said Commissioners and the State Veterinarian and his assistants shall have, while engaged in carrying out the provisions of this act, the same power and protection that other peace officers have, and any such officer who fails or refuses to enforce the lawful orders and quarantine of said board, or any member thereof; or any veterinarian acting under them, in the proper execution of the powers conferred by this act, shall be deemed guilty of a misdemeanor and punished as provided in Section 4 of this act.

SEC. 11. The said board shall cooperate with any commissioner or other officer appointed by the United States for the suppression of contagious diseases among domestic animals, so far as the provisions of this act and the appropriations made in accordance therewith will allow, in suppressing and preventing the spread of contagious and infectious diseases among domestic animals in this State.

SEC. 12. It shall be the duty of the said Board of Commissioners to keep a record of all their acts and proceedings and report the same to the Governor annually, or oftener if required, for publication. The annual report shall include an item-



ized statement of all sums expended by them under this act, including a statement of all damages recommended by them to be paid for all animals slaughtered, and the amounts paid therefor.

SEC. 13. The members of said board shall each receive the sum of \$5 per day for each day necessarily employed in the discharge of their duties, their necessary expenses, and other incidental expenses necessarily incurred in the performance of their duties under this act, to be paid on certified and itemized vouchers to be approved by the Governor.

SEC. 14. All acts and parts of acts inconsistent herewith are hereby repealed.

[Clause 35 of the general appropriation act of 1899.]

Thirty-fifth. To the Board of Live Stock Commissioners the following sums are hereby appropriated: For salary of Secretary, \$1,800 per annum; to pay the expenses of the commissioners, \$3,000 per annum; for assistant secretary, who shall be a stenographer and typewriter, the sum of \$1,200 per annum; for salary of five agents at the Union Stock Yards (Chicago), one agent at the National Stock Yards (East St. Louis), and one at Peoria, \$9,000 per annum; for janitor and messenger of office, \$720 per annum; for salary of assistant veterinarian at Union Stock Yards, Chicago, \$1,800 per annum; for salary and expenses of State Veterinarian, \$3,500 per annum; for telegraphing, postage, express, and other incidental expenses of the office, \$1,200 per annum; also for paying damages for animals diseased or exposed to contagion slaughtered; for per diem and traveling expenses of assistant State veterinarians and agents, and expenses of the board or its officers incurred in making examinations of the same or in making examinations of any animals supposed to be diseased; for property necessarily destroyed, and for expenses of disinfection of premises when such disinfection is practicable under the provisions of any law of this State for the suppression and prevention of the spread of contagious and infectious diseases among domestic animals, the sum of \$20,000, or so much thereof as may be necessary; and any sums of money that may be received by the Board of Live Stock Commissioners as the net proceeds of sale of the healthy carcasses of slaughtered animals under the provisions of this law shall be paid by them into the State Treasury; also for paying expenses of conducting tuberculin tests among dairy and breeding cattle, and for paying damages for cattle destroyed that respond to the tuberculin test and are diseased with tuberculosis, \$5,000 per annum, or so much thereof as may be necessary, the valuation in such cases to be determined by the board in accordance with the provisions of law, and the amount of damages to be paid in each case to be based upon the value of each animal as disclosed and determined by a postmortem examination.

#### PROCLAMATIONS AND RULES AND REGULATIONS.

In consequence of the second proclamation given herewith, dated August 7, 1900, there are no restrictions on the importation of dairy and breeding cattle now being enforced in Illinois.

Proclamation scheduling localities and territory on account of tuberculosis among dairy and breeding cattle.

STATE OF ILLINOIS, EXECUTIVE DEPARTMENT,  
*Springfield, June 13, 1899.*

Whereas I have received from the State Board of Live Stock Commissioners the following communication:

To His Excellency JOHN R. TANNER, *Governor of Illinois:*

SIR: Pursuant to the terms of an act of the General Assembly entitled, "An act to revise the law in relation to the suppression and prevention of the spread

of contagious and infectious diseases among domestic animals," approved June 27, 1885, in force July 1, 1885, as amended by an act approved and in force April 20, 1887, and an act approved June 15, 1887, and in force July 1, 1887, the State Board of Live Stock Commissioners herewith reports to your Excellency the fact that tuberculosis, a dangerously contagious disease, prevails to a greater or less extent among the cattle constituting the dairy and breeding herds of all the States and Territories of the United States, and of foreign countries, and that cattle affected with this disease, being brought into the State of Illinois, are dangerous and liable to communicate said disease to other cattle with which they are brought in contact, and respectfully requests your Excellency to issue a proclamation in pursuance of the terms of said above-entitled act, scheduling all States and territory within the United States, other than the State of Illinois, and all foreign countries, and prohibiting the importation of dairy or breeding cattle (cows, bulls, or calves) therefrom into the State of Illinois, except in accordance with the rules and regulations adopted by this board and herewith submitted for your approval.

We have the honor to be, very respectfully, your obedient servants,

J. H. PADDOCK,  
JAMES P. LOTT,  
J. M. DARNELL,  
*Commissioners.*

Attest:

C. P. JOHNSON, *Secretary.*

Now, therefore, I, John R. Tanner, Governor of the State of Illinois, as provided by Section 4 of the above-entitled act, do hereby make proclamation of the foregoing facts, and schedule the foregoing territory, to wit:

All of the States and territory of the United States, other than the State of Illinois, and all foreign countries.

And prohibit the importation of dairy or breeding cattle (cows, calves, or bulls, used or intended to be used for dairy or breeding purposes) from the above-described territory into the State of Illinois, except under the regulations hereto attached and made a part hereof, that have been prescribed by the State Board of Live Stock Commissioners and approved by me.

RULES AND REGULATIONS prescribed by the State Board of Live Stock Commissioners of Illinois, governing the importation of dairy and breeding cattle into this State from States and territory scheduled or to be scheduled by the Governor's proclamation with reference to tuberculosis among cattle.

RULE 1. Any shipper or owner of dairy or breeding cattle in States or territory scheduled or to be scheduled by the Governor on account of tuberculosis among cattle, desiring to ship such cattle into the State of Illinois, must, before offering the same for shipment to any railroad or transportation company—which is meant to include boats, ferries, and bridges—or before driving the same into this State, have such cattle tested with tuberculin by a veterinarian recognized by the sanitary authorities of the State in which such owner or shipper resides and authorized by such authorities to make such tests.

RULE 2. Before any such cattle destined for shipment as aforesaid are offered to any railroad company for such shipment, or are driven into the State of Illinois, they must be tested with tuberculin by a veterinary inspector duly authorized by the State Veterinary Sanitary authorities of the State from which such cattle are to be shipped or driven, who has been accepted by the State Board of Live Stock Commissioners of Illinois to make such tests in accordance with the rules of said Board. On the completion of said test, said veterinary inspector shall make out a statement of the temperatures in duplicate of such cattle as shall not show a reaction to the tuberculin test to exceed 1.5 degrees in excess of the highest temperature taken before injecting with tuberculin, filling out properly all blanks therein; he shall certify such statement and when the owner of the cattle shall have made the affidavit on the back thereof that the animals to be shipped are the identical animals referred to in the certificate, said veterinary inspector shall

deliver the original copy of said certificate to said owner and shall mail the duplicate copy thereof to the Secretary of the State Board of Live Stock Commissioners at Springfield, Ill. The shipper may then immediately ship such certified cattle, by presenting the original copy of certificate to the railroad company, to be attached to way bill, memorandum bill, or bill of lading accompanying the shipment. [Note.—Blanks will be furnished on application to the Secretary of the State Board of Live Stock Commissioners, Springfield, Ill.]

RULE 3. In conducting such tuberculin test, the veterinarian shall take at least four preliminary temperatures at intervals of two hours during the day of the evening of injecting, and at least five temperatures at intervals of two hours, commencing ten hours after injection.

RULE 4. No shipment of dairy or breeding cattle destined to any point in the State of Illinois from States and territory described and designated in the proclamation of the Governor aforesaid shall be received by any railroad or transportation company doing business in the State of Illinois from the original shipper or from any connecting railroad or transportation company, unless the same be accompanied by the certificate designated in Rule 2, properly endorsed as provided therein; such certificate to be attached to the way bill, memorandum bill, or bill of lading accompanying the shipment, and to be delivered with said bill to the consignee.

RULE 5. Any dairy or breeding cattle (cows, bulls, or calves) shipped or driven into the State of Illinois from other States and territory designated and described in the Governor's proclamation aforesaid without being accompanied by the certificate aforesaid properly endorsed, will, upon discovery, be placed in quarantine until tested with tuberculin by a veterinarian designated by this board, which test shall be made at the expense of the owner; and any cattle that shall react to such test and be condemned will be destroyed without compensation to the owner.

This proclamation to go into effect and be in force from and after the first day of July, A. D. 1899.

In testimony whereof I hereunto set my hand and cause the great seal of the State of Illinois to be affixed.

Done at the city of Springfield on the day and year first above written.

JOHN R. TANNER, *Governor*.

By the Governor:

JAMES A. ROSE, *Secretary of State*.

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STATE OF ILLINOIS,

OFFICE OF STATE BOARD OF LIVE STOCK COMMISSIONERS,

Springfield, June 22, 1899.

*To whom it may concern:*

By direction of the Governor, it is herewith ordered that his proclamation with reference to tuberculosis among dairy and breeding cattle destined for shipment into the State of Illinois, and the regulations under said proclamation, shall not be held to apply to cattle to be brought into the State from other States for the purpose of exhibition at the State Fair, or District or County Fairs: *Provided*, That in the event that sales shall be made from such exhibition herds, to remain in the State of Illinois, such cattle so sold shall be first submitted to the tuberculin test before the sale is consummated and the cattle are shipped to their destination.

J. H. PADDOCK,

J. P. LOTT,

J. M. DARNELL,

*Commissioners*.

Attest:

C. P. JOHNSON, *Secretary*.

Approved:

JOHN R. TANNER, *Governor*.



PROCLAMATION temporarily suspending the operation of the regulations contained in the proclamation of the Governor of Illinois with reference to tuberculosis among dairy and breeding cattle, issued June 13, 1899.

STATE OF ILLINOIS, EXECUTIVE DEPARTMENT,

*Springfield, August 7, 1900.*

Whereas I have received from the State Board of Live Stock Commissioners the following communication:

*SPRINGFIELD, August 6, 1900.*

To His Excellency, JOHN R. TANNER, *Governor of Illinois:*

SIR: Whereas, The Judge of the County Court of Dekalb County, Ill., has, in the trial of a criminal case pending in said court, on change of venue from Kane County, entitled, The People of the State of Illinois *vs.* Smith Younges, brought for the violation of the quarantine regulations contained in your proclamation of June 13, 1899, with reference to tuberculosis among cattle, held that your said proclamation is void because the report of the State Board of Live Stock Commissioners of Illinois and the representations contained therein upon which said proclamation was based are insufficient and not in compliance with the provisions of the statute in such case made and provided, and

Whereas, In a similar case, pending and on trial in Kane County, entitled, The People of the State of Illinois *vs.* Elmer Fellows, the Judge of the County Court held that the act under which said proclamation was issued is constitutional and that the proclamation itself is valid, and

Whereas, The aforesaid case, tried in Dekalb County, because of being a criminal prosecution, can not be appealed to the Supreme Court and a Judicial decision of the highest tribunal of the State secured, and

Whereas, A replevin case is now pending in Kane County, growing out of the enforcement of the aforesaid quarantine regulations, that will come up for a hearing in the Circuit Court of Kane County at the September term, and will afford an opportunity for a final decision on the constitutionality of the act in question and the validity of the aforesaid proclamation by the Supreme Court,

The State Board of Live Stock Commissioners of Illinois herewith respectfully recommends to Your Excellency the issuance of a proclamation suspending the operation of your proclamation of June 13, 1899, scheduling all States and territory of the United States, other than the State of Illinois, and all foreign countries, and prohibiting the importation of cattle therefrom into the State of Illinois until such cattle shall be tested with tuberculin, etc., until a decision is procured from the Supreme Court in the case now pending, above referred to, as to the constitutionality of the law and validity of said proclamation.

We have the honor to be, very respectfully, your obedient servants,

J. H. PADDOCK,  
JAMES P. LOTT,  
J. M. DARNELL,

Attest:

*State Board of Live Stock Commissioners.*

C. P. JOHNSON, *Secretary.*

Now, therefore, I, John R. Tanner, Governor of the State of Illinois, do hereby make proclamation in pursuance of the recommendations contained in the foregoing communication, and hereby suspend the further operation of my proclamation scheduling localities and territory on account of tuberculosis among dairy and breeding cattle, dated and issued at Springfield, June 13, 1899, until such time as the Supreme Court shall pass upon the constitutionality of the act by authority of which said proclamation was issued, and the validity of said proclamation: *Provided*, That nothing in this proclamation shall be construed so as prevent the prosecution or defense of any litigation now pending, growing out of the enforcement of the quarantine regulations in said proclamation of June 13, 1899.

This proclamation to go into effect and be in force from and after date of the issuance thereof.

In testimony whereof, I hereunto set my hand and cause the great seal of the State of Illinois to be affixed.

Done at the city of Springfield this 7th day of August, A. D. 1900.

JOHN R. TANNER, *Governor.*

By the Governor:

JAMES A. ROSE, *Secretary of State.*



RULES of the State Board of Live Stock Commissioners of Illinois regarding investigation of tuberculosis among dairy and breeding cattle, and making compensation.

WHEREAS, The Forty-first General Assembly has made an appropriation to this Board for the payment of damages to the owners of dairy and breeding cattle affected with tuberculosis, as determined by the tuberculin test, therefore, in pursuance of the terms of the clause making such appropriation aforesaid,

*Resolved*, That the following rules governing the investigation of the reported or suspected cases of tuberculosis among cattle, and for determining the compensation in each case to be made, be, and the same are hereby, adopted:

RULE 1. All cases of supposed tuberculosis among dairy or breeding cattle reported to this board, or any member or officer thereof, State Veterinarian, or any Assistant State Veterinarian or agent of the board, shall be investigated under the direction of the board, and if upon clinical examination by the veterinarian designated to make such examination sufficient evidence of the existence of tuberculosis in any animal of any herd shall appear, the affected animal, together with all the exposures, shall be placed in quarantine until the entire herd is tested with tuberculin under the direction of the board.

RULE 2. All animals in any herd tested with tuberculin that shall give a reaction in temperature of 2 or more degrees (where such reaction is, in the opinion of the veterinarian in charge, due to the tuberculin) shall be deemed affected with tuberculosis, isolated from the balance of the herd, and held in quarantine until slaughtered and examined postmortem. All animals that react 1.5 degrees and less than 2 degrees shall be isolated and held in quarantine for a retest.

RULE 3. For the purpose of fixing and determining the value of animals to be slaughtered because of reaction to the tuberculin test, and for determining the amount of compensation to the owner to be certified in each case, animals tested and taken for slaughter shall be divided into six classes, to be known as follows: Class A, Class B, Class C, Class D, Class E, and Class F, and the class to which any animal belongs shall be determined by the State Veterinarian (or the Assistant State Veterinarian in charge of the postmortem inspection), who shall be guided in such determination by the appearance and condition of the internal organs of each animal upon postmortem inspection.

Class A shall include all animals that shall, upon postmortem examination, fail to disclose the presence of tuberculosis in any of the organs.

Class B shall include all animals affected with the disease in its incipient stage.

Class C shall include all animals apparently affected for a period of one year.

Class D shall include all animals apparently affected for a period of two years.

Class E shall include all animals apparently affected for a period of three years.

Class F shall include all animals apparently affected for a period of more than three years.

For all animals of the A Class the owner shall be entitled to the full amount of the appraisement.

For all animals of the B Class he shall be entitled to receive 75 per cent of the appraisement.

For all animals of the C Class he shall be entitled to receive 50 per cent of the appraisement.

For all animals of the D Class he shall be entitled to receive 35 per cent of the appraisement.

For all animals of the E Class he shall be entitled to receive 25 per cent of the appraisement.

For all animals of the F Class he shall be entitled to receive 15 per cent of the appraisement.

*Provided*, That in the event that the proceeds from any carcass shall exceed the percentage of valuation determined, the owner shall receive the full amount of such proceeds.

## INDIANA.

Indiana has a general law concerning contagious diseases among domestic animals, but the only work done in connection with tuberculosis is in making examinations, when requested, in cases where a veterinarian's certificate is required to accompany cattle entering from another State.

The law under which the Live Stock Sanitary Commission is operating and the rules governing the work of the commission are given below:

## LAW.

## [CHAPTER 212.]

AN ACT to provide for a Live Stock Sanitary Commission and a State Veterinarian, and to prescribe their powers and duties, and to prevent and suppress contagious and infectious diseases among the live stock of the State, and to declare an emergency. (Approved March 9, 1889.)

SECTION 1. *Be it enacted by the General Assembly of the State of Indiana*, That a commission is hereby established which shall be known under the name and style of "The State Live Stock Sanitary Commission." The commission shall consist of three commissioners who are practical agriculturists and engaged in and identified with the live stock interests of the State. One of said commissioners shall be elected for a term of four years, one for a term of three years, and one for the term of two years, whose terms of office shall commence upon the taking and filing with the Secretary of State the oath of office herein provided for, and shall continue in office until their successors are elected and qualified. The said Live Stock Sanitary Commission, as soon as practicable after its organization, [shall] appoint an experienced, competent, and skilled veterinary surgeon for the State, who at the time of his appointment shall be a graduate in good standing of a recognized college of veterinary surgery, who shall hold his office for the term of two years, and until his successor shall be appointed and qualified, unless for cause he shall be sooner removed from said office by order of said commission.

SEC. 2. Immediately on the taking effect of this act the State Board of Agriculture shall nominate and the Governor confirm the appointment of three commissioners, as provided for in Section 1 of this act, and during the annual meeting of the State Board of Agriculture immediately preceding the expiration of the term of any commissioner his successor shall be nominated and confirmed by the Governor for a term of four years.

SEC. 3. Said commissioners and veterinary surgeons, before they enter upon the duties of their said offices, shall each take and subscribe an oath of office similar in form to that required of State officers, and file the same with the Secretary of State.

SEC. 4. Each commissioner shall receive the sum of \$4 per day and necessary expenses for the time necessarily spent in the discharge of the duties herein required of him, and the said veterinary surgeon shall receive such sum for his services as said commission may from time to time allow him, not to exceed in any one year the rate of \$2,000 per year, and never to equal that amount unless said commission should require his entire time to be devoted to said service during said year.

SEC. 5. It shall be the duty of said commission to protect the health of the domestic animals of the State from all contagious or infectious diseases of a malignant character, and for this purpose said commission is hereby authorized and empowered to establish, maintain, and enforce such quarantine, sanitary,

and other regulations as it may deem necessary: *Provided*, That the provisions of this act shall not apply to swine.

SEC. 6. It shall be the duty of any person who discovers, or has reason to believe, that any domestic animal belonging to him or her, in his care, or that may come under his observation belonging to other parties, is infected with any disease supposed to be dangerous, contagious, or infectious, to immediately report such fact to the secretary of the board of health of the county where such animal is situated, whose duty it shall be to report the fact to said Sanitary Commission.

SEC. 7. It shall be the duty of said secretary of such county board of health to keep a record of all cases so reported to him, including the age, sex, and distinguishing characteristics of such animals, and it shall be the duty of such secretary of said board of health to immediately examine, either in person or by a qualified person appointed by him for that purpose, all animals so reported to be diseased, and if they find that said animal or animals are affected with a contagious disease, to immediately report the same to said commission, or some member thereof, and the said secretary shall promptly take such measures as he shall deem most expedient to prevent the spread of the disease until said commission shall be able to relieve him from the charge and care of such animal or animals. All the necessary expenses necessarily incurred by said secretary of such board of health and his agents in carrying out the provisions of this act shall be paid in the same manner as are those of the commission.

SEC. 8. The commission, or any member thereof to whom the existence of any infectious or contagious disease of domestic animal or animals is reported, shall forthwith proceed to the place where such domestic animal or animals are and examine the same, and if in his or their opinion any infectious or contagious disease exists, he or they shall prescribe such temporary quarantine and regulations as will prevent the spread of the contagion or infection, and notify the State Veterinarian, who shall forthwith proceed to the place where the said contagious or infectious disease is said to exist, and examine said animal or animals and report his finding to said commission, who shall at once prescribe and apply such rules and regulations as in their judgment the exigencies of the case may require for the effectual suppression and eradication of the disease; and for that purpose the said commission may list and describe the domestic animals affected with such disease, and those which have been exposed thereto, and include within the affected district or premises so defined and quarantined with reasonable certainty as would lead to their identification, and no domestic animal liable to become infected with the disease, or capable of communicating the same, shall be permitted to enter or leave the district, premises, or grounds so quarantined, except by authority of the commission. The said commission shall also, from time to time, give and enforce such directions and prescribe such rules and regulations as to separating, mode of handling, treating, feeding, and caring for such diseased and exposed animals as shall be necessary to prevent the two classes of animals from coming in contact with each other, and perfectly isolate them from all other domestic animals of the same class which have not been exposed thereto, and which are susceptible to becoming infected with the disease; and the said commission and veterinarian are hereby authorized and empowered to enter upon any ground or premises, and into any building upon such premises, when and wherever it may be necessary to enter, to fully carry out the provisions of this act. When in the opinion of said commission it shall be necessary, in order to prevent the further spread of any contagious or infectious disease among the live stock of the State, to destroy animals affected with or which have been exposed to any such disease, it shall determine what animals shall be slaughtered, and appraise the same, as hereinafter provided, and cause the same to be slaughtered and the carcasses disposed of as in their judgment will best protect the health of domestic animals in that locality.



SEC. 9. When the commission shall have determined the quarantine and other regulations necessary to prevent the spread among domestic animals of any malignant, contagious, or infectious disease found to exist among the live stock of the State and given their orders as hereinbefore provided, prescribing quarantine and other regulations, it shall notify the Governor of the State thereof, whose duty it shall be to at once issue his proclamation proclaiming the boundary of such quarantine as fixed by such commission, together with the orders, rules, and regulations prescribed by said commission, which proclamation may be published by written or printed handbills posted within the boundaries or on the lines of the district, premises, places, or grounds quarantined: *Provided, however*, That if the commission decide that it is not necessary, by reason of the limited extent of the district in which such diseases exist, that a proclamation should be issued, then none shall be issued, but such commission shall give such notice as may to it seem best to make the quarantine established by it effective.

SEC. 10. Whenever said commission shall direct the killing of any domestic animal or animals, it shall be the duty of the commissioners to appraise the animal or animals condemned, and in fixing the value thereof the commissioners shall be governed by the value of said animal or animals at the date of appraisement.

SEC. 11. When any live stock shall be appraised and killed by order of the commission, it shall issue to the owner of said stock so slaughtered a certificate showing the number and kind of animals killed, for what reason killed, and the amount, in their judgment, to which the owner is entitled for said animals from the State, and report the same to the Governor of the State, which certificate, if approved by the Governor, shall be presented to the Auditor of State, who shall draw his warrant therefor on the State Treasury, payable out of any moneys in the Treasury not otherwise appropriated.

SEC. 12. When any animal or animals are slaughtered under the provisions of this act by order of the commission, the owner thereof shall be paid therefor the appraised value as fixed by the appraisement hereinbefore provided for: *Provided, however*, That the right to payment for animals slaughtered by order of the commission under the provisions of this act shall not extend to the owners of animals which have been brought into the State in a diseased condition, or from a State, country, territory, or district in which the disease with which the animal is affected, or to which it has been exposed, exists. Nor shall any animal be paid for by the State which may have been brought into the State in violation of any law or quarantine regulation thereof, or the owner of which shall have violated any of the provisions of this act, or disregarded any rule, regulation, or order of the Live Stock Sanitary Commission, or any member thereof, made under the provisions of this act. Nor shall any animal be paid for by the State which came into the possession of the claimant with the claimant's knowledge that such animal was diseased, or was suspected of any disease, or having been exposed to any contagious or infectious disease.

SEC. 13. Any person who shall have in his possession any domestic animal affected with any contagious or infectious disease, knowing such animal to be so affected, or, after having received notice that such animal is so affected, who shall permit such animal to run at large, or who shall keep such animal where other domestic animals not affected by, or previously exposed to, such disease may be exposed to its contagion or infection, or who shall sell, ship, drive, trade, or give away such diseased animal or animals which have been exposed to such infection or contagion, or who shall move or drive any domestic animal in violation of any direction, rule, regulation, or order establishing or regulating any quarantine, shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be fined in any sum not less than \$10 nor more than \$500 for each of such diseased or exposed domestic animals which he shall have thus permitted to run at large, sell, ship, drive, trade, or give away in violation of the provisions of this act: *Provided*, That



any owner of any domestic animal which has been with or exposed to any contagious or infectious diseases may dispose of the same after having obtained from the State Veterinarian a certificate of health for such animal or animals.

SEC. 14. Any person or corporation who shall knowingly bring into the State any domestic animal or animals which are infected with any contagious or infectious disease, or any animal or animals which have been exposed to any such contagious or infectious disease shall, for every such offense, forfeit and pay to the State not less than \$100 nor more than \$500, to be recovered by suit in the name of the State.

SEC. 15. Any person who owns or is in possession of live stock which is infected, or which is reported under the provisions of this act to be infected with any contagious or infectious disease, who shall wilfully prevent or refuse to allow the State Veterinarian or commission or other authorized officer or officers to examine such stock, or shall hinder or obstruct the State Veterinarian or other authorized officer or officers in any examination of or in any attempts to examine such stock, shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be fined in any sum not less than \$10 nor more than \$500.

SEC. 16. Any person who shall knowingly violate, disregard, evade, or attempt to violate, disregard, or evade any of the provisions of this act, or who shall knowingly violate, disregard, or evade any of the rules, regulations, orders, or directions of the Live Stock Sanitary Commission establishing and governing quarantine shall be deemed guilty of a misdemeanor, and upon conviction thereof, shall be fined in any sum not less than \$10 nor more than \$500.

SEC. 17. The commission provided for in this act shall have power to employ at the expense of the State such persons and purchase such supplies and materials as may be necessary to carry into full effect all necessary orders given by it.

SEC. 18. The commissioners shall have power to call upon any sheriff, deputy sheriff, or constable to execute their orders, and such officers shall obey the orders of said commissioners, and the officers performing such duties shall receive compensation therefor as is provided by law for like services, and shall be paid therefor in like manner as other expenses of said commission are paid. And any officer may arrest and take before any justice of the peace of the county any person found violating any of the provisions of this act, and such officer shall immediately notify the prosecuting attorney of such arrest, whose duty it shall be to prosecute the person so offending according to law.

SEC. 19. Whenever the Governor of the State shall have good reason to believe that dangerous, contagious, or infectious disease has become epizootic in certain localities in other States, Territories, or countries, or that there are conditions which render such domestic animals from such infected districts liable to convey such disease, he shall by proclamation prohibit the importation of any live stock of the kind diseased into the State, unless accompanied by a certificate of health given by a duly authorized veterinary surgeon, and all such animals arriving in this State shall be examined immediately by said commission or some member thereof, and if he or they deem it necessary, he or they shall have said animal inspected by the State Veterinary Surgeon, and if, in his opinion, there is any danger of contagion or infection, they shall be placed in close quarantine until such danger of contagion or infection is passed, when they shall be released by order of said commission or some member thereof.

SEC. 20. For the purposes of this act, each member of the Live Stock Sanitary Commission is hereby authorized to administer oaths and affirmations.

SEC. 21. The commission is hereby authorized and required to cooperate with any board, commission, or officer acting under any present or future act of the Congress of the United States for the suppression and prevention of contagious and infectious diseases among domestic animals, and the same right of entry, inspection, and condemnation of diseased animals upon private premises is hereby

granted to the United States board, commission, or officer as is hereby granted to the State Live Stock Sanitary Commission.

SEC. 22. Whenever it is deemed necessary by the State Live Stock Sanitary Commission to supervise and inspect any of the lines of transportation in this State and the stock yards in connection with the same, suitable inspectors shall be appointed by said commission whose duty it shall be to examine such lines of transportation and stock yards as to condition, manner of transporting stock, and such other matters as such commission may direct, and report such examination in detail to said commission, and the expense of such examination shall be paid by the corporation or corporations or individuals in charge of such lines of transportation or stock yards. Any such corporation, corporations, or individuals owning or operating such lines of transportation or stock yards shall conform promptly to all regulations made by said Sanitary Commission of which they shall have notice from such commission, and for any neglect or omission to comply with such regulations as herein provided, they shall be subject to the fines and penalties in this act provided, to be enforced and collected according to the provisions of this act.

SEC. 23. That whenever by act of the Congress of the United States the payment of the appraised value of domestic animals slaughtered for the purpose of preventing the spread of infectious and contagious diseases among any class or classes of domestic animals in the several States shall have been provided, and the necessary appropriation for such payment out of the National Treasury made by such act of Congress, then, from and after that date there shall be no further payment made out of the State Treasury for domestic animals of the class or classes payment for which is so provided by said act or acts of Congress, by order of said State Live Stock Sanitary Commission.

SEC. 24. The State Live Stock Sanitary Commission shall make annually a detailed report of its doings to the Governor, which report shall by the Governor be transmitted to the Legislature at its next regular or called session.

SEC. 25. That an emergency exists for the immediate taking effect of this act; therefore, the same shall be in force from and after its passage.

## RULES.

### RULES OF THE STATE LIVE STOCK SANITARY COMMISSION.

1. Upon reliable information that any domestic animal is infected with any dangerously contagious or infectious disease, the case must at once be reported to the secretary of the county board of health of the county in which the case exists, and said secretary shall at once notify the secretary of this commission. A failure to comply with the above will render the party liable to be prosecuted under the laws of the State of Indiana provided in such cases.

2. When any horse, mule, ass, cattle, or sheep is reported to be infected with any dangerously contagious or infectious disease, said secretary or any member of the Live Stock Sanitary Commission shall at once notify the State Veterinarian of such report, who shall at once visit the premises where such animals are and thoroughly examine the same, and if, upon examination, he is satisfied that the disease is a dangerously contagious or infectious disease he shall quarantine the animal or animals and premises, and also quarantine all animals or premises that have been exposed to such disease, and promptly notify the commission of his action, accompanying the same with all the correspondence relative to the case, and also notify the owner of his opinion.

3. All quarantines established by the State or an Assistant State Veterinarian shall continue in force until removed by order of the commission. Parties whose animals are quarantined under the provisions of this law may have the same

released from quarantine by making satisfactory proof to the commission that the cause for which such quarantine was originally declared no longer exists.

4. The State Veterinarian or secretaries of county boards of health making reports of investigation shall give the name and post office address of the owner of animals inspected, location of such animals, date of inspection, complete description of animals diseased and of animals exposed, a description of the exposure to which they have been subjected, the condition of the diseased animals, the name and address of the nearest constable, and the time employed in such investigation. The report must be accompanied by an exact duplicate of the quarantine notice served, with return made thereon of the manner of service, and all correspondence relative to the cause. Said report must be addressed to the Live Stock Sanitary Commissioners of the State of Indiana, and directed to the secretary at Lafayette, Indiana. Proper blanks will be furnished upon application to the secretary.

5. Whenever it shall come to the knowledge of the secretary of the county board of health that animals have been brought into his locality from a State or county known or believed to be infected, against which the Governor of the State has proclaimed, he shall immediately notify the secretary of this commission of the facts so far as he knows them covering the following points, viz: Locality from whence such animals came, name and post-office of owner or person in charge, if shipped by railroad or boat, giving names of same, time of arrival, number, age, sex, and breed of animals, so far as it is practicable to ascertain.

6. The commission will not approve the claim for any animals destroyed unless they were so destroyed by the order of some member of the commission, having first been appraised by them.

7. When it is deemed necessary, any member of the commission may appoint any local veterinarian to do any service in examining, treating, and caring for diseased animals, and no bill for services, examinations, or for materials and expenses will be recognized unless first ordered by some one of the commission.

8. Assistant State Veterinarians, when appointed by the commission to do special work, shall be entitled to receive for their services \$3 per day and necessary expenses; but in no case shall they receive more than \$4 per day and necessary expenses while engaged in the public service; neither shall they be permitted to make any charge nor receive any compensation from a private individual during the time they are actually employed and paid by the State. Nor will any bill for services or expenses be approved unless so ordered by some member of the commission.

9. Any person desiring to ship any animal or animals from this State to another State, the authorities of which require health certificates to accompany such animal or animals, may call upon the State Veterinarian, or some one authorized by this commission, and request him to inspect such animal or animals. It shall thereupon be the duty of such veterinarian to at once make such inspection, and if he finds the animal or animals to be healthy and to come from a locality wherein there does not, nor has not for four months preceding, existed any case of contagious disease among the kind of animals in question, he shall give to the owner of such animal or animals a certificate of health, specifying the number, sex, and breed of such animal or animals. For such services said veterinarian shall be entitled to receive from the owner the same compensation as herein allowed him by the State, together with his necessary expenses in going from and to his regular place of business or abode. In no case shall the State be liable for the cost of such services; neither shall the veterinarian receive from any private person for such service a compensation greater than herein authorized. Any violation of this provision shall be considered sufficient ground for dismissal from the service of the State. At the end of each month veterinarians making such inspections are required to make a tabulated report of the same to the secretary of this commission.



## IOWA.

A veterinary surgeon, appointed by the Governor, has supervision of all contagious and infectious diseases among domestic animals, and, with the concurrence of the State Board of Health, "may make such rules and regulations as he may regard necessary for the prevention and suppression and against the spread" of said diseases. These rules and regulations require the concurrence of the executive council for publishment and enforcement.

The veterinarian makes investigations of animals upon the order of the Governor; he may destroy diseased animals under certain conditions, paying for them their actual value in their condition when condemned. An appeal may be taken to the district court by either party if a condemned animal is found not to be diseased and the indemnity exceeds \$25. No indemnity shall be paid for animals destroyed while in transit across the State.

The authorities are empowered to cooperate with the United States authorities in the prevention or eradication of infectious or contagious diseases.

## LAW.

## [CHAPTER 14, TITLE 12, CODE.]

SEC. 2529. The State Veterinary Surgeon shall be appointed by the Governor, subject to removal by him for cause, who shall hold office for three years. He shall be a graduate of some regularly established veterinary college, skilled in that science, and shall be by virtue of his office a member of the State Board of Health.

SEC. 2530. He shall have supervision of all contagious and infectious diseases among domestic animals in, or being driven or transported through, the State, and is empowered to establish quarantine against animals thus diseased or that have been exposed to others thus diseased, whether within or without the State, and with the concurrence of the State Board of Health may make such rules and regulations as he may regard necessary for the prevention and suppression, and against the spread of said disease or diseases, which rules and regulations, the executive council concurring, shall be published and enforced, and in the performance of his duties he may call for the assistance of any peace officer.

SEC. 2531. Any person who wilfully hinders, obstructs, or resists said Veterinary Surgeon, his assistants, or any peace officer acting under him or them when engaged in the duties or exercising the powers herein conferred, or violates any quarantine established by him or them, shall be guilty of a misdemeanor.

SEC. 2532. Said surgeon shall biennially make a full and detailed report of his doings since his last report to the Governor, including his compensation and expenses, which report shall not exceed 150 pages of printed matter.

SEC. 2533. Whenever a majority of any board of supervisors or township trustees, or any city or town council, whether in session or not, shall in writing notify the Governor of the prevalence of, or probable danger from, any of said diseases, he shall notify the Veterinary Surgeon, who shall at once repair to the place designated in said notice and take such action as the exigencies may demand, and the Governor may, in case of emergency, appoint a substitute or assistants with like qualifications and with equal powers and compensation.

SEC. 2534. Whenever in the opinion of the State Veterinary Surgeon the public safety demands the destruction of any stock, the same may be destroyed upon the



written order of such surgeon, with the consent of the owner, or upon approval of the Governor, and by virtue of such order such surgeon, his deputy or assistant, or any peace officer may destroy such diseased stock, and the owner thereof shall be entitled to receive its actual value in its condition when condemned, to be ascertained and fixed by the State Veterinary Surgeon and the nearest justice of the peace, who, if unable to agree, shall call upon the nearest, or other justice of the peace upon whom they agree as umpire, and their judgment shall be final when the value of the stock, if not diseased, would not exceed \$25; but in all other cases either party shall have the right of appeal to the district court, but such appeal shall not delay the destruction of the diseased animals. The Veterinary Surgeon shall at once file with the Governor his written report thereof, who shall, if found correct, indorse his finding thereon, whereupon the Auditor of State shall issue his warrant therefor upon the Treasurer of State, who shall pay the same out of any moneys at his disposal under the provisions of this act, but no compensation shall be allowed for stock destroyed while in transit through or across the State, and the word "stock," as herein used, shall be held to mean cattle, horses, mules, and asses.

SEC. 2535. The Governor, with the Veterinary Surgeon, may cooperate with the Government of the United States for the objects of this chapter, and the Governor may accept and receipt for any moneys receivable by the State under the provisions of any act of Congress which may at any time be in force upon this subject and pay the same into the State treasury to be used according to the act of Congress and the provisions of this chapter as nearly as may be.

SEC. 2536. There is annually appropriated, out of any moneys not otherwise appropriated, the sum of \$3,000, or so much thereof as may be necessary, for the uses and purposes herein set forth.

SEC. 2537. Any person, except the Veterinary Surgeon, called upon under the provisions of this chapter, shall be allowed and received \$2 per day while actually employed.

SEC. 2538. When engaged in the discharge of his duties the Veterinary Surgeon shall receive the sum of \$5 per day and his actual expenses, the claim therefor to be itemized, verified, accompanied with written vouchers, and filed with the State Auditor, who shall allow the same and draw his warrant upon the treasury therefor.

#### RULES AND REGULATIONS.

Rules and regulations for the control of contagious and infectious diseases of animals were issued on January 19, 1898, but the only reference to bovine tuberculosis is in Rule 12, which is as follows:

RULE 12. In suspected cases of bovine tuberculosis the tuberculin test shall be recognized as a valuable diagnostic.

The report of the veterinarian for the biennial period ended June 30, 1899, contains the following as rules which "should be adopted by all who desire to have healthy animals and their dairy products free from taint of any kind." These were also published as information by the State Board of Health in Circular No. 5—1900:

#### DIRECTIONS FOR DISINFECTING DAIRY BARNs AND FOR THE CARE OF MILK.

1. Clean out all litter, excrement, rejected fodder, cobwebs, and dust, thoroughly sweeping down the walls and ceilings.

2. Spray ceiling, walls, and floor with a solution of bichloride and water, one to five hundred.

3. Thoroughly whitewash all parts of the barn with a wash containing one-quarter of a pound of carbolic acid and a pound and one-half of lime to a gallon of water.

4. See that the drainage from under the floors is sufficient to carry away all refuse matter. This is an important factor in keeping a healthy, clean barn.

5. See that all manure is carted away daily. We find in some instances great piles of heating manure against the outside walls, and the offensive fumes therefrom permeating all parts of the barn.

6. See that the watering troughs are cleansed two or three times a week, and only pure water given the dairy cow.

After milking each cow the milk should be carried to a scrupulously clean milk room, and there strained and cooled. It should be stirred frequently until thoroughly cooled. A can of milk may be placed in a refrigerator and allowed to cool without stirring and it is certain to have a bad odor and taste, but with proper stirring while cooling this will be prevented.

### KANSAS.

Kansas has no specific laws relative to tuberculosis, but rules and regulations were issued by the State Sanitary Commission on March 1, 1900, which were the basis of a proclamation by the Governor on March 5, 1900. However, a second proclamation, raising quarantine established by the first, was made on October 17, 1900, due to a decision of a court in Illinois adverse to tuberculosis regulations. This action was taken because Illinois had suspended all rules and regulations pending a decision of the supreme court, and because Missouri had done likewise.

The proclamations are given herewith:

#### PROCLAMATIONS.

TOPEKA, KANS., *March 1, 1900.*

To His Excellency W. E. STANLEY, *Governor of Kansas:*

For the better protection of the domestic animals of the State of Kansas, and to prevent the spread of contagious and infectious diseases among same, we herewith report to your excellency the fact that tuberculosis, a dangerous and contagious disease, prevails to a greater or less extent among the cattle constituting the dairy and breeding herds of the States hereinafter named, and that cattle affected with this disease are being brought into the State of Kansas, and are liable to communicate said disease to other cattle with which they are brought in contact. Therefore we respectfully request your excellency to issue a proclamation prohibiting the importation of cattle from the States hereinafter named, except in accordance with the rules and regulations adopted by this board and herewith submitted to you for your approval.

M. C. CAMPBELL,  
TAYLOR RIDDLE,  
F. H. CHAMBERLAIN,

*Members Live Stock Sanitary Commission.*

Whereas the Live Stock Sanitary Commission of the State of Kansas on March 1, 1900, adopted the following rules and regulations:

Whereas the Live Stock Sanitary Commission of the State of Kansas have ascertained that a great many of the breeding and dairy cattle in the States of Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York,

New Jersey, De'aware, Pennsylvania, Ohio, Kentucky, Tennessee, Indiana, Michigan, Illinois, Wisconsin, Minnesota, Iowa, and Nebraska are infected with a contagious and infectious disease in cattle known as tuberculosis, and that some of said cattle are being shipped into the State of Kansas for breeding and dairy purposes, it is therefore ordered:

First. That from and after this date it shall be unlawful for any cattle to be shipped, driven, or transported from the above-named States into the State of Kansas for breeding or dairy purposes: *Provided, however,* That shipments may be made from such States into the State of Kansas for breeding and dairy purposes after said cattle have been examined and found free of tuberculosis and a permit and bill of health given by a veterinarian of the United States Bureau of Animal Industry, or a veterinarian acting under the order and direction of the Live Stock Sanitary Board of any of the above-named States, and the certificate so given by such veterinarians shall be given in duplicate, the original of which shall be forwarded to the Secretary of the Live Stock Sanitary Commission, Topeka, Kans., and the duplicate given to the railroad company, to be attached to the bill of lading for said cattle. And no railroad company shall accept any such cattle nor bring nor ship any such cattle into the State of Kansas from any of the above-named States for breeding or dairy purposes without the certificate and bill of health herein provided for; and no railroad company shall accept from its connecting lines any cattle shipped in violation of this provision.

Second. *Provided, however,* That native cattle of the State of Nebraska may be moved into the State of Kansas upon the owner or person in charge thereof making affidavit, stating, in substance, that said cattle are natives of said State, and that said cattle have not been in any of the States above named for a year immediately preceding the making of said affidavit. Said affidavit shall be made before some officer authorized to administer oaths, and the above affidavit so made shall be given in duplicate, the original of which shall be forwarded to the Secretary of the Live Stock Sanitary Commission, Topeka, Kans., and the duplicate shall be given to the owner or person in charge of said cattle, to be attached to the bill of lading for said cattle, or carried by the owner or person in charge when driven in; and no railroad company shall accept any such cattle for shipment, nor bring nor ship any such cattle into the State of Kansas for breeding or dairy purposes from the State of Nebraska, nor accept from its connecting lines any cattle shipped in violation of this provision.

Third. Cattle brought into Kansas from any of the above named States for the purpose of exhibition at county, district, or State fairs shall not be subject to the above regulations: *Provided, however,* That in the event sales shall be made from such exhibition, and the cattle destined to points in Kansas, the animal sold shall be submitted to the tuberculin test before the sale is consummated or the cattle moved or shipped to their destination. In case the test should show any such animals to be affected with tuberculosis, a permit for shipment to any point in this State shall not be granted.

Fourth. All railroad, live stock, transportation, and stock-yard companies, and their employees, and all other persons, are hereby forbidden to transport, drive, or in any way handle cattle in Kansas, except in compliance with the foregoing rules, under the pains and penalties of the following statute:

Extract of Chapter 2, Session Laws of 1884: "SEC. 21. Any person who shall violate, disregard, or evade, or attempt to violate, disregard, or evade, any of the \* \* \* rules and regulations, orders or directions of the Live Stock Sanitary Commission establishing and governing quarantine, shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be fined in any sum not less than \$100 or more than \$5,000."

Sheriffs, constables, and police officers in Kansas are hereby directed to enforce these regulations, and to report any violations of same to this commission.

In testimony whereof I hereby set my hand, and cause to be affixed the great seal of the State of Kansas.

Done at Topeka, Kans., this 5th day of March, 1900.

W. E. STANLEY, *Governor of Kansas.*

By the Governor:

GEO. A. CLARK, *Secretary of State.*

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PROCLAMATION RAISING QUARANTINE.

STATE OF KANSAS, EXECUTIVE DEPARTMENT.

Whereas on the 13th day of October, A. D. 1900, the Live Stock Sanitary Commission of the State of Kansas made the following recommendation, to wit:

To the GOVERNOR OF THE STATE OF KANSAS:

Pending a decision of the supreme court of the State of Illinois as to the legality of the rules and regulations of the State governing the movement of cattle, and requiring the application of tuberculin to ascertain whether or not the cattle are afflicted with tuberculosis, the Live Stock Sanitary Commission of Illinois have suspended their rules and regulations. The Live Stock Sanitary Commission of the State of Missouri have done likewise; and at a meeting of the Live Stock Sanitary Commission of Kansas, held at our office October 11, 1900, it was unanimously decided to recommend to your excellency to suspend the rules and regulations promulgated by you March 1, 1900, scheduling the following States, to wit, Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Delaware, Pennsylvania, Ohio, Kentucky, Tennessee, Indiana, Michigan, Illinois, Wisconsin, Minnesota, Iowa, and Nebraska, and by so doing to permit cattle from said scheduled States to enter Kansas without restrictions.

M. C. CAMPBELL, *Chairman.*

Now, therefore, I, W. E. Stanley, Governor of the State of Kansas, in accordance with said recommendation of the Live Stock Sanitary Commission, do hereby proclaim and declare that the quarantine established March 1, 1900, as aforesaid, against the introduction of cattle into the State of Kansas from the said States of Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Delaware, Pennsylvania, Ohio, Kentucky, Tennessee, Indiana, Michigan, Illinois, Wisconsin, Minnesota, Iowa, and Nebraska, and the same is hereby, raised, and that said rules and regulations promulgated March 1, 1900, be suspended from and after this date.

In testimony whereof I have hereunto subscribed my name and caused to be affixed the great seal of the State of Kansas. Done at Topeka this 17th day of October, A. D. 1900.

W. E. STANLEY, *Governor.*

Attest:

GEO. A. CLARK, *Secretary of State.*

KENTUCKY.

There is no specific law in Kentucky relative to bovine tuberculosis, but the general law against contagious and infectious diseases affecting cattle is broad enough to embrace tuberculosis.

The State Board of Health is charged with the enforcement of the law against contagious or infectious diseases, and it is made their duty promptly to take measures for suppressing or preventing their spread. They may issue a proclamation stating that such a disease exists within the State, naming the locality, and ordering owners of



affected stock to seclude the same. The farms or premises where such disease exists may be quarantined by the board and issue such regulations concerning the quarantine as they may deem necessary. The board may prescribe regulations for the destruction of diseased animals. No animal, however, shall be killed until after examination by a veterinarian in the employ of the board. Indemnity is not provided.

## LAW.

## [CHAPTER 5, ARTICLE II, KENTUCKY STATUTES.]

SECTION 48. Whenever any contagious or infectious disease affecting cattle shall exist in this State, it shall be the duty of the State Board of Health to take measures to promptly suppress and effectively prevent the same from spreading.

SEC. 49. For such purposes the State Board of Health shall have power to issue their proclamation, stating that infectious or contagious disease exists in any county or counties of the State, and warning all persons to seclude all animals in their possession that are affected with such disease, or have been exposed thereto, and ordering all persons to take such precautions against the spreading of such disease as the nature thereof may, in their judgment, render necessary or expedient; to order that any premises, farm or farms where such disease exists, or has existed, be put in quarantine at the owner's expense, so that no cattle be removed from or brought to the premises so quarantined, and to prescribe such regulations concerning the mode of quarantine as they may judge necessary or expedient to prevent infection or contagion being communicated in any way from the places so quarantined; to call on the sheriffs and deputy sheriffs to assist in enforcing and carrying out the provisions of said proclamations and orders, whose duty it shall be to observe and obey all of said orders and proclamations; to employ a veterinary surgeon and practitioner, and such other persons as may be necessary from time to time in performing their duties under this article, and to prescribe regulations for the destruction of such animals so affected, and for the disposition of their hides and carcasses, and all objects which might convey infection or contagion, at the owner's expense. But no animal shall be destroyed by said board unless first examined by a veterinary practitioner acting in the employ or under the direction of said board, or unless the owner thereof knows that such cattle are so affected. Said board shall also have power to prescribe regulations for the disinfection of all premises, buildings, and railway cars, and all objects by or from which infection may take place or be conveyed: to alter, modify, cancel, or withdraw any of said proclamations, orders, or regulations whenever they may deem it proper so to do.

SEC. 50. Any person knowingly transgressing or failing to comply with the terms of any proclamation, order, or regulation issued or prescribed by the board shall be guilty of a misdemeanor and on indictment be fined in a sum not less than \$200 nor more than \$1,000; and the owner of any cattle affected with the contagious disease known as pleuropneumonia, and knowing the same to be so affected, who fails to kill and bury or burn them, or fails to report the same at once to the State Board of Health, shall be fined for each offense in a sum not less than \$200 nor more than \$1,000; and the said board, upon the failure of any such person to immediately kill said diseased cattle when ordered by the board so to do, shall have the right to kill the same at the owner's expense.

SEC. 51. [Refers to pleuropneumonia.]

SEC. 52. [Refers to pleuropneumonia.]

SEC. 53. The State Board of Health shall have the power to employ a veterinarian, who shall be a regular practitioner and graduate of some college of veterinary surgery and practice, and who shall be known as the State veterinarian,

whose duty it shall be to render such service under this law as the board may direct. Said veterinarian shall be entitled for the services rendered to a sum not exceeding \$5 per day and traveling expenses for the time he is actually engaged at work for said board, to be paid by the county court of the county in which the disease is prevailing. The veterinarian shall receive nothing from any other person for examinations and work done at the instance of said board, and in the event he does he shall, upon indictment and conviction, be fined in a sum not less than \$200 nor more than \$1,000.

SEC. 54. In order to effectually carry out the provisions and intentions of this law, the board may engage and obtain the services of any veterinarian in the employ of the United States, and otherwise cooperate with the proper department of the Federal Government in the suppression of said disease in this Commonwealth.

SEC. 55. The Governor shall, in addition to the number of persons now on said State Board of Health, appoint three discreet and intelligent housekeepers engaged in the cattle business, whose duty it shall be to serve on said board without any charge for services, but said three persons shall only have the right and power to act thereon with reference to matters embraced in this article.

SEC. 56. If any person shall be convicted of a violation of 50th, 51st, or 52d sections of this article, the jury shall have the power to determine by their verdict whether or not such person is at the time of his trial and conviction the owner of any cattle which have been exposed to said disease by having been within the same inclosure with a diseased animal within four months next before trial, and if they find he has such cattle they will find the number, sex, and distinguishing marks, and it shall be the duty of the court to order the destruction of said cattle by the sheriff at the owner's expense, and the expense thereof shall be taxed as costs in the case.

### LOUISIANA.

Louisiana has no law relative to bovine tuberculosis.

### MAINE.

The administration of the laws relative to tuberculosis in Maine is by a commission of three persons appointed by the Governor.

One of the duties of the State of Maine Cattle Commission is to cause investigation to be made of tuberculosis, and for this purpose the commission or its agent may enter any premises, cars, or vessels where there is reason to believe that the disease exists. If the disease is discovered, the fact shall be published in the newspapers and the officials of transportation companies notified.

Quarantine is required, as is the appraisal of the diseased animals, in accordance with the rules and regulations made by the commission. The commission must destroy such diseased animals and pay the owner one-half of their value, as determined upon the basis of health before infection: *Provided, however,* That the appraised value shall not be more than \$100 for pedigreed animals nor more than \$50 for those not pedigreed. No indemnity is allowed for an animal which may have contracted or been exposed to tuberculosis in a foreign country, or on the high seas, or may have been brought into the State from another State within three years previous; and no indemnity is allowed when the owner or agent knowingly conceals the existence of such disease or the fact of exposure to it.

The commission is empowered to issue rules and regulations for carrying the laws into effect. All such rules and regulations, however, must have the approval of the Governor before they become operative and be published.

A fine of \$100, or imprisonment not exceeding ninety days, or both fine and imprisonment, is the penalty for obstructing in any way the work of the commission.

If the appraised value of an animal is not accepted by the owner, a rigid quarantine is maintained against such animal.

Transportation companies within the State are prohibited from accepting for shipment any cattle known to be affected with tuberculosis, and no owner of cattle so affected shall drive them on foot from one part of the State to another. The penalty for violation of this provision is a fine not exceeding \$200, or by imprisonment not exceeding six months, or by both fine and imprisonment.

#### LAW.

AN ACT to extirpate contagious diseases among cattle. (Approved February 14, 1899.)

*Be it enacted by the Senate and House of Representatives in Legislature assembled, as follows:*

SECTION 1. [As amended by act approved March 10, 1893.] Chapter 194. That for the purpose of facilitating and encouraging the live-stock interests of Maine, and for extirpating all insidious, infectious, and contagious diseases, now or that may be among cattle, horses, and sheep, and especially tuberculosis, the Governor of the State is hereby authorized and required, immediately after the passage of this act, to appoint a board of cattle commissioners consisting of three persons of known executive ability who shall be charged with the execution of the provisions of this act, and who shall be known and designated as the State of Maine Cattle Commission, and whose powers and duties shall be those provided for in this act, and whose tenure of office shall be at the option of the Governor. The compensation of said commissioners shall be at the rate of \$3 per day during the time they are actually engaged in the discharge of their duties as commissioners. The said commissioners shall respectively take an oath to faithfully perform the duties of their office, and shall immediately organize as such commission by the election of one of their number as president thereof, and proceed forthwith to the discharge of the duties devolved upon them by the provisions of this act.

SEC. 2. [As amended by act approved March 10, 1893.] Chapter 194. That it shall be the duties of said commissioners to cause investigation to be made as to the existence of tuberculosis, pleuropneumonia, foot-and-mouth disease, and in any other infectious or contagious diseases. And such commissioners or their duly constituted agent are hereby authorized to enter any premises or places, including stock yards, cars, and vessels within any county or part of the State in or at which they have reason to believe there exists any such diseases, and to make search, investigation, and inquiry in regard to the existence thereof. Upon the discovery of the existence of any of the said diseases, the said commissioners are hereby authorized to give notice, by publication, of the existence of such disease, and the locality thereof, in such newspapers as they may select, and to notify in writing the officials or agents of any railroad, steamboat, or other transportation company doing business in or through such infected locality of the existence of such disease; and are hereby authorized and required to establish and maintain such quarantine of animals, places, premises, or localities as they may deem neces-



sary to prevent the spread of any such disease, and also to cause the appraisal of the animal or animals affected with the said disease, in accordance with such rules and regulations by them as hereinafter authorized and provided, and also to cause the same to be destroyed, and to pay the owner or owners thereof one-half of their value, as determined upon the basis of health before infection, out of any moneys appropriated by the legislature for that purpose: *Provided, however,* That no appraised value shall be more than \$100 for an animal with pedigree recorded or recordable in the recognized herdbooks of the breed in which the animal destroyed may belong, nor more than \$50 for an animal which has no recordable pedigree: *Provided further,* That in no case shall compensation be allowed for an animal destroyed under the provisions of this act which may have contracted or been exposed to such disease in a foreign country, or on the high seas, or that may have been brought into this State within three years previous to such animal's showing evidence of such disease, and the owner or owners shall furnish satisfactory evidence as to the time such animal or animals shall have been owned in the State; nor shall compensation be allowed to any owner who in person or by agent knowingly and wilfully conceals the existence of such disease, or the fact of exposure thereto in animals of which the person making such concealment, by himself or agent, is in whole or part owner.

SEC. 3. That the said commissioners are hereby authorized and required to make, record, and publish rules and regulations providing for and regulating the agencies, methods, and manners of conducting, the investigations aforesaid regarding the existence of said contagious diseases: for ascertaining, entering, and searching places where such diseased animals are supposed to exist; for ascertaining what animals are so diseased or have been exposed to contagious diseases; for making, reporting, and recording descriptions of the said animals so diseased or exposed and destroyed, and for appraising the same, and for making payment therefor; and to make all other needful rules and regulations which may, in the judgment of the commissioners, be deemed requisite to the full and due execution of the provisions of this act. All such rules and regulations, before they shall become operative, shall be approved by the Governor of Maine and thereafter published in such manner as may be provided for in such regulations; and after such publication said rules and regulations shall have the force and effect of law, so far as the same are not inconsistent with this act and other laws of the State or United States.

SEC. 4. That any person or persons who shall knowingly and wilfully refuse permission to said commissioners, or either of them, or their duly constituted agent, to make, or who knowingly and wilfully obstructs said commissioners, or either of them, or their duly constituted agent, in making all necessary examinations of and as to animals supposed by said commissioners to be diseased as aforesaid, or in destroying the same, or who knowingly attempts to prevent said commissioners, or either of them, or their duly constituted agent, from entering upon the premises and other places hereinbefore specified where any of said diseases are by said commissioners supposed to exist, shall be deemed guilty of a misdemeanor, and, upon conviction thereof, or of either of the acts in this section prohibited, shall be punished by fine not exceeding \$100 or by imprisonment not exceeding ninety days, or by both fine and imprisonment, at the discretion of the court.

SEC. 5. That any person who is the owner of or who is possessed of any interest in any animals affected with any of the diseases named in Section 2 of this act, or any person who is agent, common carrier, consignee, or otherwise is charged with any duty in regard to any animal so diseased or exposed to the contagion of such disease, or any officer or agent charged with any duties under the provisions of this act, who shall knowingly conceal the existence of such contagious disease or the fact of such exposure to said contagion, and who shall knowingly and wil-



fully fail within a reasonable time to report to the said commissioners their knowledge or their information in regard to the existence and location of said disease or of such exposure thereto, shall be deemed guilty of a misdemeanor, and shall be punishable as provided in Section 4 of this act.

SEC. 6. That when the owner of animals decided under the provisions of this act, by the proper authority, to be diseased or to have been exposed to contagion, refuses to accept the sum authorized to be paid under the appraisement provided for in this act, it shall be the duty of the commissioners to declare and maintain a rigid quarantine as to the animals decided as aforesaid to be diseased or to have been exposed to any contagious or infectious disease, and of the premises or places where said cattle may be found, according to the rules and regulations to be prescribed by said commissioners, approved by the Governor, and published as provided in the third section of this act.

SEC. 7. That no person or persons owning or operating any railroad, nor the owner or owners or masters of any steam, sailing, or other vesse's within the State, shall receive for transportation or transport from one part of the State to another part of the State, or to bring from any other State or foreign country any animals affected with any of the diseases named in Section 2 of this act, or that have been exposed to such diseases, especially the disease known as tuberculosis, knowing such animals to be affected or to have been so exposed, nor shall any person or persons, company or corporation, deliver for such transportation to any railroad company or to the master or owner of any ves el any animals, knowing them to be affected with or to have been exposed to any of said diseases: nor shall any person or persons, company or corporation, drive on foot or transport in private conveyance from one part of the State to another part of the State any animal, knowing the same to be affected with or to have been exposed to any of said diseases. Any person or persons violating the provisions of this section shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be punished by fine not exceeding the sum of \$200 or by imprisonment not exceeding six months, or by both fine and imprisonment.

SEC. 8. That it shall be the duty of the several county attorneys to prosecute all violations of this act which shall be brought to their notice or knowledge by any person making the complaint under oath: and the same shall be heard in any supreme judicial court having jurisdiction in the county in which the violation of this act has been committed.

SEC. 9. That the said commissioners are hereby authorized to appoint or elect one of their number as secretary of said board, who shall receive a reasonable compensation for his services during the time in which, under the provisions of this act, the services of the said commissioners shall be required. The said commissioners shall make and preserve a full record of all rules and regulations promulgated under the provisions of this act, of all payments and expenses hereunder incurred, and all other transactions performed by said commissioners in the discharge of their duties as herein provided: and the said commissioners shall, on or before the first Wednesday in January of each year, during their continuance in service, and at other times as they may deem conducive to the public interests, or as they may be required so to do by the Governor of State, report to said Governor full and accurate accounts of their expenditures, and other proceedings under the provisions of this act, and of the condition of said diseases if any, in the State, to be communicated by him to the Legislature. Whenever the functions of said commission shall be suspended or terminated, it shall turn over to the Secretary of State all its books, papers, records, and other effects, taking his receipt therefor, and he shall remain the custodian of the same until such time as the functions of said commission may be restored.

SEC. 10. That the commissioners shall have power, and are hereby authorized, to employ skilled veterinarians and such other agents and employees as they may

deem necessary to carry into effect the provisions of this act, and to fix the compensation of the person or persons so employed, and to terminate such employment at their discretion; and they are authorized, out of the moneys by this act appropriated, to make such expenditures as may be needed for the actual and necessary traveling expenses of themselves and their said employees, stationery, expense of disinfecting premises, cars, and other places, destroying diseased and exposed animals, and paying for the same, and such other expenses and expenditures as they may find to be actually necessary to properly carry into effect the provisions of this act.

SEC. 11. That the moneys appropriated by this act shall be paid over to the secretary of said commission from time to time as the same may be found to be needed, upon requisition made by the said commissioners, and shall be disbursed by the said secretary of said commission only upon vouchers approved by said commissioners or a majority of them. The said secretary shall, before entering upon the duties of his office, take an oath to faithfully discharge the duties thereof, and shall enter into a bond to the State of Maine, with sureties to be approved by the Treasurer of State, in such sum as he may designate, for the faithful accounting of all moneys received by the said secretary of the commission under the provisions of this act.

SEC. 12. That for the purpose of carrying into effect the provisions of this act, the sum of \$5,000, or so much thereof as may be necessary, is hereby appropriated out of any moneys in the treasury not otherwise appropriated.

SEC. 13. That all acts and parts of acts inconsistent or in conflict with the provisions of this act be, and the same are hereby, repealed.

## RULES AND REGULATIONS.

### NOTICE OF QUARANTINE.

TO WHOM IT MAY CONCERN: Public notice is hereby given, that in consequence of the prevalence of tuberculosis among Massachusetts cattle, as disclosed by the official reports of their authorities, supplemented by postmortems held in Maine of cattle purchased in that State for dairying and breeding purposes, the Cattle Commissioners of the State of Maine believe that the public health of its citizens and the welfare of this commonwealth demand that a rigid quarantine (against all cows whether in milk or dry, and all bulls for breeding purposes) be maintained on and after January 1, 1892, until further notice, and all such cattle entering the State of Maine thereafter will be subject to quarantine at the owner's expense: *Provided, however*, That the above regulations shall not apply to Western cattle coming through Massachusetts into Maine for the purpose of slaughter.

The attention of all persons is directed to Sections 2, 3, 4, 5, and 7, of Chapter 138, of the Public Laws of Maine, 1887, applying to cattle affected with contagious diseases, and which will hereafter be rigidly enforced.

JOHN W. DEERING, *Saco, President.*

F. O. BEAL, *Bangor, Treasurer.*

GEO. H. BAILEY, *Deering, D. V. S.*

A quarantine station will be provided near Morrill's Corner, Deering, where all cattle brought into Maine in violation of the above notice will be kept until discharged, at the expense of the owner or owners; and particular attention is called to the full reprint of the law relating to contagious diseases upon the following pages of this circular letter, which will be rigidly enforced after this date.

PORTLAND, January 1, 1892.

## NOTICE OF QUARANTINE.

The Cattle Commissioners of the State of Maine, having found from recent experience that it has become absolutely necessary to supplement our former notice of quarantine issued January 1, 1892, so that it shall include not only Massachusetts, but all other States, order that no cattle for dairy or breeding purposes shall be brought into this State either by road, water, railroad, or other conveyance until further notice; and all such cattle entering our State without a permit signed by some member of our board will be subject to quarantine at the owner's expense, and the attention of all persons is directed to Chapters 177 and 194 of the Public Laws of Maine, which will hereafter be rigidly enforced.

JOHN W. DEERING, *Saco, President.*

F. O. BEAL, *Bangor, Treasurer.*

GEO. H. BAILEY,

*Deering, State Veterinary Surgeon.*

## . MARYLAND.

Maryland has a general law concerning contagious and infectious diseases among domestic animals, but tuberculosis is not specifically mentioned. The enforcement of such laws is by the State Live Stock Sanitary Board, whose duty it is "to protect the health of the domestic animals of the State from all exotic, contagious, or infectious diseases," and is authorized to enforce such quarantine, sanitary, or other regulations as it may deem necessary.

Local boards of health are required to investigate reported cases of contagious or infectious diseases in their respective counties, and, if found to be contagious or infectious, to report the same to the Live Stock Sanitary Board.

The board has power to prohibit the introduction into the State of animals which they have reason to believe are affected with such diseases or which have been exposed thereto.

The Governor is authorized to issue a proclamation declaring a quarantine against States or Territories where such diseases exist, and during the pendency of the quarantine no animals shall be brought into the State from the districts named.

A Chief Veterinary Inspector is appointed by the Governor, who has power, with the consent of the Live Stock Sanitary Board, to isolate and quarantine all infected or exposed animals; to prescribe such regulations as he may deem necessary to prevent infection or contagion being communicated in any way from the premises so quarantined; to prescribe regulations for the destruction of such animals, etc.

Practicing veterinarians within the State are required to report all cases of contagious or infectious disease that may come to their knowledge; a failure to do so renders them liable to a fine not exceeding \$50 for each offense.

All rules and regulations issued by the board have the force and effect of laws.

Whether to quarantine or slaughter diseased animals is in the discretion of the board. Animals may be slaughtered after appraisalment, and the amount appraised is authorized as indemnity.

The board is authorized to cooperate with the Bureau of Animal Industry in the work of eradicating any contagious or infectious disease.

#### LAW.

AN ACT to prevent the spread of contagious or infectious diseases among the live stock of this State. (Approved April 5, 1888.)

SECTION 1. *Be it enacted by the General Assembly of Maryland,* That a commission is hereby established which shall be known under the name and style of the "State Live Stock Sanitary Board," to consist of three commissioners, who are practically engaged in the breeding of live stock, who shall be appointed by the Governor, by and with the advice and consent of the Senate, biennially, at such time as executive appointments are required by law to be made, and who shall hold their offices until their successors are duly appointed and qualified.

SEC. 2. *And be it enacted,* That it shall be the duty of said board, as far as possible, to protect the health of the domestic animals of the State from all exotic, contagious, or infectious diseases, and glanders in horses, and for this purpose it is authorized and empowered to establish, maintain, and enforce such quarantine, sanitary or other regulations as it may deem necessary, and shall maintain an office in the city of Baltimore; it shall constitute and prosecute diligent inquiries in the several counties and ascertain so far as possible the exact condition of the health of the live stock in said counties, and the local boards of health of the several counties shall investigate all reported cases of contagious or infectious diseases of live stock in their respective counties, and if found to be contagious or infectious shall report the same at once to the said Live Stock Sanitary Board; and such board shall have the power to prevent the introduction into this State of animals from other States which they may have reason to believe are affected with a contagious or infectious disease, or have been exposed thereto, and to detain the same at any place for inspection or quarantine, in its discretion.

SEC. 3. *And be it enacted,* That on presentation to the Governor by the said Live Stock Sanitary Board of the facts, showing the existence of any contagious or infectious disease among the domestic animals of any other State, Territory, or district, the Governor may, by proclamation, declare such State, Territory, or district, or any part thereof, in quarantine, and during the pendency of such quarantine it shall not be lawful for any person or persons, company or corporation, to bring into the State of Maryland any animals or animal of the kind so infected from the district so quarantined. Any person or persons, company or corporation, whether owner, agent, or carrier, convicted of a violation of the provisions of this section, shall be subject to a fine not less than \$100 nor more than \$500 for each offense.

SEC. 4. *And be it enacted,* That each member of said board shall be paid the sum of \$5 per day and the necessary expenses for time actually spent in the discharge of his duties. And the sum of \$3,000 per year be, and the same is hereby, appropriated, or so much thereof as may be necessary to meet the expenses of said board, including rent, printing, counsel fees, etc.

SEC. 5. *And be it enacted,* That the Governor shall also appoint a Chief Veterinary Inspector, who shall be a graduate in good standing of some recognized school of veterinary medicine, who shall hold his office and be paid a salary not exceeding \$1,000 and traveling expenses, in the discretion of the Governor, whose duty it shall be to visit the stables of the city and counties wherever and when-



ever he has reason to believe contagious or infectious disease may exist, and he may visit any such stable at any hour of the day, between sunrise and sunset, and shall have power, with the consent of the said Live Stock Sanitary Board, to order all animals which have been exposed to such contagion or infection to be isolated in such manner as the nature thereof may, in his judgment, render necessary to prevent the spreading of such disease: to order that any premises, farm or farms, stables, or railway cars where such disease exists, or has existed, be put in quarantine, so that no domestic animals of the same species shall be removed from or brought to the premises or place so quarantined until the same shall have been properly disinfected; to prescribe such regulations as he may judge necessary or expedient to prevent infection or contagion being communicated in any way from the places so quarantined; to call upon all sheriffs and deputy sheriffs, constables, policemen, or other officers of the State, the city of Baltimore, or of any county, for information and assistance to carry out and enforce the provisions of such orders and regulations; to prescribe regulations for the destruction of animals affected with or exposed to an infectious or contagious disease, and for the proper destruction of their hides and carcasses, and all objects which might carry infection or contagion; to prescribe regulations for the disinfection of all buildings, premises, and railway cars, and of all objects from which or by which infection or contagion might take place or be conveyed; to alter and modify from time to time, as he may deem expedient, the terms of all such orders and regulations, and to cancel or withdraw the same at any time; and it shall be the duty of all sheriffs and deputy sheriffs, constables, policemen, or other officers of the State, city of Baltimore, or counties, to obey and observe all orders and instructions which they may receive from said veterinary inspector in the enforcement of the provisions of this act within their respective jurisdiction.

SEC. 6. *And be it enacted*, That any person who shall violate or transgress the terms or requirements of any order or regulation issued and prescribed by the said Veterinary Inspector, with the consent of the Live Stock Sanitary Board, under the authority of this act, or shall refuse to said Veterinary Inspector or his assistants, access to his, her, or their premises, farms, stables, cars, sheds, or pens, or shall resist said inspector or his assistants in applying any of the quarantine orders or regulations, or shall conceal the fact that the contagious or infectious disease exists on his premises, shall be subject to a fine of not more than \$100 nor less than \$50, which fine may be imposed by any justice of the peace of the city of Baltimore or any county where such offense may be committed.

SEC. 7. *And be it enacted*, That it shall be the duty of all persons practicing veterinary medicine in this State to report immediately to said board all cases of contagious or infectious disease among the live stock which may come to their knowledge, and a failure to report for forty-eight hours after he or they shall come into such knowledge shall be deemed a misdemeanor, and on conviction thereof he or they shall be fined not exceeding \$50 for each offense.

SEC. 8. *And be it enacted*, That it shall be unlawful for any person to inoculate any animal in this State with the virus of any infectious or contagious disease incident to animals, without the consent of the said Live Stock Sanitary Board, and that any person convicted of this offense shall be fined a sum not less than \$1 [\$100?] nor more than \$500, in the discretion of the court.

SEC. 9. *And be it enacted*, That for the performance of the duties imposed on them by this act all constables, sheriffs, or deputy sheriffs, or other State officers, shall be paid as for the performance of similar duties under existing laws.

SEC. 10. *And be it enacted*, That it shall be the duty of all State's Attorneys to prosecute all persons accused of violating the provisions of this act, and to defend in all cases of appeals from appraisements.

SEC. 11. *And be it enacted*, That all rules and regulations formulated and issued by said board in pursuance of the powers hereby conferred on it shall have the force

and effect of laws, and all violations of such rules and regulations shall be punished as misdemeanors are punished at common law, and all appraisements of animals to be slaughtered or of buildings to be destroyed shall be approved by said board before such animals are slaughtered or such buildings destroyed; and said board shall have the discretion to have such animals slaughtered or quarantined.

SEC. 12. *And be it enacted*, That any person who shall sell or otherwise dispose of an animal which he knows or has good reason to believe is affected with any contagious or infectious disease, or has been exposed thereto within ninety days, or shall permit the same to pass over or upon any public highway, street, lane, or alley, or to graze any unfenced lot or piece of ground without the consent of the said board, shall, on conviction thereof, be fined not less than \$50 nor more than \$100 for each animal so driven or exposed; such fine may be imposed by any justice of the peace of the city of Baltimore or county where the offense was committed.

SEC. 13. *And be it enacted*, That it shall be unlawful for any person or persons to wilfully expose any animal to others affected with a contagious or infectious disease, or to put or suffer to be put any healthy or unexposed animals of the same species into any stable or on any premises which have been declared to be infected until the same shall have been declared to be free from such infection by the said veterinary inspector with the consent of said board; any person or persons convicted of violating any of the provisions of this section shall be subject to a fine of not less than \$1 [\$100?] nor more than \$500 for each offense; and the animal or animals so introduced into such infected stables or premises shall be slaughtered by said veterinary inspector without appraisement or compensation from the State.

SEC. 14. *And be it enacted*, That in the event of any building or buildings, sheds, stables, stable furniture, hay, straw, or fodder being reported to the said board by said inspector as being incapable of proper disinfection, the said board may, in its discretion, have such buildings and articles so infected appraised, as hereinafter provided for the appraisement of animals, and destroyed.

SEC. 15. *And be it enacted*, That in the event of its being deemed necessary for the said Veterinary Inspector and said board, to prevent the spread of contagious or infectious disease, to cause any animal or animals so diseased or exposed to such disease to be slaughtered, the value of such animal or animals shall be appraised in their then condition by two sworn appraisers, to be sworn before any officer authorized to administer oaths and affirmations, one of which appraisers to be appointed by the owner or custodian of such animals, the other by the said Veterinary Inspector, or in case the said owner or custodian of such animals shall neglect or refuse to name such appraiser, then by two appraisers, to be appointed by said inspector, who, in case of disagreement, shall call in a third, which appraisement, when approved by said board, shall be filed with the Comptroller; and the Comptroller shall forthwith issue his warrant to the Treasurer for the amount of said appraisement, in favor of said owner or owners, and if the owner or owners of such animals or buildings or other property shall not be satisfied with the amount of said appraisement, he or they may, within sixty days, appeal to the circuit court of the county, or to the Baltimore City court, if such animals or buildings are within the city of Baltimore, by filing in said court a copy of the appraisement with a petition for a writ of subpoena against the said Veterinary Inspector, which appeals shall be acted on by said court in the same manner as appeals from justices of the peace.

SEC. 16. *And be it enacted*, That said board is hereby authorized and empowered to agree with the Bureau of Animal Industry of the Department of Agriculture of the United States, or other properly constituted authority of the United States, for cooperation in the work of eradicating any contagious or infectious disease among live stock in the State of Maryland, but such agreement shall provide that such work shall be under the control of the State authorities.

SEC. 17. *And be it enacted*, That in the event of an epidemic of contagious or infectious disease among the live stock of this State, it shall be the duty of the said board to appoint such assistants to said inspector as may be necessary to promptly suppress the same and to fix their pay.

SEC. 18. *And be it enacted*, That all diseased animals that, under the provisions of this act, shall be slaughtered at any slaughterhouse where meat is prepared for market shall be slaughtered under the supervision of the Chief Veterinary Inspector or his assistant, and it shall be the duty of said inspector to see that the carcasses and offal of such diseased animals, whether such disease is contagious or otherwise, are destroyed and not sold for food. Any inspector who shall corruptly pass as healthy a diseased animal shall, on conviction thereof, be fined not exceeding \$500 and forfeit his commission.

SEC. 19. *And be it enacted*, That all acts or parts of acts inconsistent with this act be, and they are hereby, repealed, provided nothing herein shall affect the commissions or terms of office of the Chief Veterinary Inspector and members of said Sanitary Board appointed and confirmed at this session of the General Assembly, nor shall any prosecution now pending for violation of the acts of 1884, Chapter 157, and 1886, Chapter 80, abate, but the same shall be prosecuted to final judgment under the provisions of said acts as if this act had not been passed.

SEC. 20. *And be it enacted*, That this act shall take effect from the date of its passage.

#### MASSACHUSETTS.

The Board of Cattle Commissioners, in their report for 1899, say: "During the past year the Commission has acted under two sets of laws. Until May 25 it carried out the provisions of Chapter 491, Acts of 1894, as amended by Chapters 476 and 496, Acts of 1896; since then it has had the enforcement of the new law to deal with."

The new law referred to provides for the appointment by the Governor of a Board of Cattle Commissioners, who shall have the power to make from time to time orders and regulations concerning the extirpation, prevention, and suppression of contagious diseases among domestic animals; and it is their duty to make orders and regulations concerning the inspection and examination of animals. The board may establish quarantine stations wherein animals may be treated for the purpose of determining the characteristics of a specific contagion and the methods by which it may be disseminated or destroyed. Animals which are found to be affected with a contagious disease may be securely isolated or killed without appraisal or payment. If an animal so killed shall appear upon postmortem examination to be free from the disease for which it was condemned, "a reasonable sum therefor shall be paid to the owner by the Commonwealth." If such an animal is found to be affected with tuberculosis the full value at the time of condemnation is paid; but no sum exceeding \$40 shall be paid. Indemnity does not extend to animals which have been brought into the State within six months or to cases where the owner has in any way contributed to the spread of the disease. Provision is made for arbitration in the matter of indemnity.

Animals imported into the State from infected places outside the State may be seized by the Board of Cattle Commissioners and held



in quarantine so long as public safety may require; and the Board may kill such animals without appraisement or payment for the same.

Any board of health, or agent thereof, or any person who has reason to suspect the existence of any contagious disease in the State must, under penalty, give written notice to the board, who shall cause an inspection to be made. If such animals are found to be free from disease, a certificate of the fact is issued to the owner; if found diseased, or suspected as being diseased, quarantine measures are put in force.

Inspectors are appointed by the Board of Cattle Commissioners, who operate under the rules and regulations of the Board.

Owners using tuberculin are not entitled to indemnity for animals which react, unless the testing is done by the Board of Cattle Commissioners or by its direction.

#### LAW.

AN ACT relative to infectious diseases among domestic animals and to establish a new Board of Cattle Commissioners. (Approved May 25, 1899.)

*Be it enacted, etc., as follows:*

SECTION 1. The Governor, with the advice and consent of the council, shall appoint a Board of Cattle Commissioners of not more than three members whose terms of office shall begin on the first day of June in the year 1899, and who shall hold office as follows: One of said members for the term of three years, one for the term of two years, and one for the term of one year, and thereafter one of said members shall be appointed annually for the term of three years. The compensation of said commissioners shall not exceed \$5 a day for each day of actual service, in addition to their traveling expenses necessarily incurred. Any member of the board may be removed by the Governor and council, who may revoke the commissions of the entire board when in their judgment the public safety may permit. Vacancies in the board by expiration of terms of service or otherwise shall from time to time be filled by appointment by the Governor with the consent of the council. The Board of Cattle Commissioners as now constituted shall cease to exist on the thirty-first day of May in the year 1899, and the duties now devolving by law upon said board shall thereafter be performed by the board created by this act.

SEC. 2. The Board of Cattle Commissioners may appoint a clerk to keep the record of its doings, who shall receive such compensation, not exceeding the sum of \$500 a year, as it shall determine.

SEC. 3. The Board of Cattle Commissioners shall keep a full record of its doings and report the same to the Legislature on or before the tenth day of January in each year, unless an earlier report is required by the Governor. An abstract of its report shall be printed in the annual report of the State Board of Agriculture.

SEC. 4. The Board of Cattle Commissioners shall have power to make from time to time orders and regulations concerning the extirpation, prevention, and suppression of contagious diseases among domestic animals, or concerning the care and treatment or destruction of animals affected with or which have been exposed to any contagious disease.

SEC. 5. The Board of Cattle Commissioners shall from time to time make orders and regulations concerning the inspection and examination of animals, the quarantine and killing of animals affected with or which have been exposed to contagious disease, the burial or other disposal of their carcasses, and the cleansing



and disinfecting of districts, buildings, or places where such contagion exists or has existed. Said board shall from time to time make and prescribe forms for records of inspectors, certificates of examinations, notices, and orders of quarantine, orders for killing and burial, and all returns to be made by inspectors which are provided for under the provisions of this act.

SEC. 6. The Board of Cattle Commissioners may establish hospitals or quarantine stations, with proper accommodations, wherein, under prescribed regulations, animals selected by such commissioners may be confined and treated for the purpose of determining the characteristics of a specific contagion and the methods by which it may be disseminated or destroyed, and it may direct inspectors to enforce and carry into effect all regulations made from time to time for that purpose.

SEC. 7. The Board of Cattle Commissioners may appoint from time to time officers, agents, and assistants whose appointment is necessary or expedient to carry out the purposes of this act, and may remove any and all of the persons so appointed. All such officers, agents, and assistants shall have the power and authority conferred upon inspectors under the provisions of Section 28 of this act, and shall receive such compensation as the board shall determine.

SEC. 8. When the Board of Cattle Commissioners or any of its members or agents, by examination of a case of contagious disease among domestic animals, is convinced that the public good requires it, the board, commissioner, or agent shall cause such animal or animals to be securely isolated, or shall cause it or them to be killed without appraisal or payment. Such order for killing shall be issued in writing by the board or any of its members, and may be directed to an inspector or other person, and shall contain such direction as to the examination and disposal of the carcass and the cleansing and disinfecting of the premises where such animal was condemned as the board or commissioner shall deem expedient. A reasonable sum may be paid out of the Treasury of the Commonwealth for the expense of such killing and burial. If it shall subsequently appear, upon postmortem examination or otherwise, that such animal was free from the disease for which it was condemned, a reasonable sum therefor shall be paid to the owner by the Commonwealth. Whenever any cattle condemned as afflicted with the disease of tuberculosis are killed under the provisions of this section, the full value thereof at the time of condemnation, not exceeding the sum of \$40 for any one animal, shall be paid to the owner out of the Treasury of the Commonwealth, if such animal has been owned within the State six months continuously prior to its being killed: *Provided, however,* That such person shall not have, prior thereto, in the judgment of the board, by wilful act or neglect, contributed to the spread of tuberculosis; but such decision on the part of the commissioners shall not deprive the owner of the right of arbitration as hereinafter provided.

SEC. 9. Said board may make and issue rules and regulations for the guidance of inspectors of animals and provisions in the inspection of meat which shall conform with the rules and regulations of the United States Bureau of Animal Industry for the inspection of meat for export and for interstate commerce.

SEC. 10. Said board may examine under oath all persons believed to possess knowledge of material facts concerning the existence or dissemination, or danger of dissemination, of contagious diseases among domestic animals, or concerning any other matter within the provisions of this act, and each member of said board shall have, for any purpose of this act, all the powers vested in justices of the peace by Chapters 155 and 169 of the Public Statutes and acts in amendment thereof, to take depositions, to compel witnesses to attend and testify before said board, and to administer oaths. The fees for such witnesses for attendance and travel shall be the same as for witnesses before the superior court. All costs and expenses incurred in procuring the attendance of such witnesses shall be allowed

and paid by the Commonwealth. Copies of the records of said board, or of any regulation or order issued by it or by any of its members under the provisions of this act, when duly certified by the secretary of said board, and any certificate by said secretary of the issuing, recording, delivering, or publishing of any such orders or regulations under the provisions of Section 13 of this act shall be competent evidence of such fact in any tribunal.

SEC. 11. Every cattle commissioner and inspector shall have power to call on sheriffs, constables, and police officers to assist him or them in the discharge of the duty provided for in this act, and it is hereby made the duty of sheriffs, constables, and police officers to assist such commissioner or inspector when requested to do so, and he or they shall have the same powers and protection while engaged in the discharge of his or their duties which peace officers have.

SEC. 12. When animals are transported within this State from places beyond its boundary lines, which places the Board of Cattle Commissioners deems to be infected, such animals may be seized and quarantined by the commissioners at the expense of the owners or consignees thereof so long as the public safety requires; and if, in their judgment, it is necessary to secure that safety they may cause such animals to be killed without appraisal of or payment for the same.

SEC. 13. All orders and regulations made by said board under the provisions of this act shall be spread upon the records of the board, and a copy thereof shall be sent to each inspector in the city or town to which the regulations or orders apply, and shall be published by such inspector in such manner as the orders and regulations shall prescribe.

SEC. 14. Whenever in any city or town the board of health or any member or agent thereof or any other person, except the members of the Board of Cattle Commissioners, who has knowledge of or has good reason to suspect the existence of any contagious disease among any species of domestic animals within the limits of this Commonwealth, or that any domestic animal is affected with any such contagious disease, whether such knowledge is obtained by personal examination or otherwise, shall immediately give written notice thereof to the Board of Cattle Commissioners or any of its members, agents, or inspectors, and for failure so to do shall be punished by a fine not exceeding \$100: *Provided, however,* That no such notice shall be given in the city of Boston relating to the diseases known as glanders, farcy, and rabies, which diseases shall be cared for by the board of health of the city of Boston.

SEC. 15. Upon the receipt of such notice from any person the Board of Cattle Commissioners shall inspect or cause to be inspected by its authorized agents any such animal or animals; and if upon such inspection such board or such inspector suspects or has reason to believe that contagion exists the board or inspector shall proceed according to the provisions of Sections 23, 24, 25, and 26 of this act.

SEC. 16. When complaint is made on oath to any police, district, or municipal court, or to any magistrate authorized to issue warrants in criminal cases, that the complainant believes that any diseased animal or animals are kept or concealed in any particular building, place, or inclosure, the court or magistrate, if convinced that there is reasonable cause for such belief, shall issue a warrant to search for such animal or animals, and all such warrants shall be directed and executed as provided in Section 3 of Chapter 212 of the Public Statutes. If upon a hearing said court or magistrate determines that any such diseased animal or animals were so kept or concealed, the same shall be destroyed or disposed of by the Board of Cattle Commissioners or its authorized agent, and no compensation shall be paid to the owner or owners thereof. If the court or magistrate does not so determine, said animal or animals shall be returned to the owner.

SEC. 17. The mayor and aldermen of cities, except as provided in Chapter 250 of the acts of the year 1896, and the selectmen of the towns shall, within thirty

days after the passage of this act, and thereafter annually in the month of March, appoint one or more persons to be the inspectors of animals, subject to the approval of the Board of Cattle Commissioners. Each inspector shall be sworn faithfully to discharge the duties of his office, and shall receive a reasonable compensation, to be paid by the city or town for which he is appointed. Such city and town officers shall have the power to remove any inspector appointed by them, and in such case shall immediately appoint another in his place. Every city and town shall, within thirty days after the passage of this act, and thereafter before the first day of April in each year, send to the Board of Cattle Commissioners a list of the qualified inspectors of animals appointed under this section for such city or town, which notice shall give the name and address of each such inspector and his occupation.

SEC. 18. Whenever the officers of a city or town neglect or refuse to carry into effect the provisions of Section 17 of this act, such city or town shall be liable to forfeit a sum not exceeding \$500 for each such refusal or neglect, and the Board of Cattle Commissioners shall have the power to appoint one or more persons to be such inspector or inspectors for such city or town. Said board shall also have the power to remove any inspector of animals appointed under the provisions of this act whenever such inspector neglects or refuses to be sworn or, in the opinion of the board, does not properly perform the duties of his office, and in such case the board shall appoint another inspector to serve for the remainder of his term. Every inspector appointed by said board shall be sworn faithfully to discharge the duties of his office and shall receive such compensation, not exceeding the sum of \$500 a year each, as said board shall determine. Such compensation shall be paid by the city or town for which he is appointed.

SEC. 19. Every inspector shall keep a record of all inspections made by him and his doings thereon, and shall make regular returns of all such inspections to the Board of Cattle Commissioners. Such records and returns shall be made in such form and at such times as the Board of Cattle Commissioners shall direct, and said board shall have at all times the right to inspect said records and make copies thereof.

SEC. 20. The duties of inspectors appointed under the provisions of Chapter 491 of the acts of the year 1894 and of acts in amendment thereof, except so far as they relate to the duties, rules, and regulations of the Board of Cattle Commissioners as defined in this act, shall hereafter be performed by the various cities and towns; and said boards of health shall have full power in all matters included under the provisions of said Chapter 491 and of acts in amendment thereof, except that the Board of Cattle Commissioners, in accordance with the provisions of this act, so far as not otherwise provided in Section 14 relating to glanders, farcy, and rabies in the city of Boston, shall have full control and authority in all matters relating to contagious diseases among domestic animals.

SEC. 21. Every inspector appointed under the provisions of this act shall carry out and enforce all regulations and orders directed to him, under the provisions of this act, by the Board of Cattle Commissioners or by any of its members.

SEC. 22. Said inspectors shall make regular and thorough inspections of all neat cattle, sheep, and swine found within the limits of their several cities and towns, except as provided in Section 14 of this act. Such inspection shall be made at such times and in such manner as the Board of Cattle Commissioners shall from time to time direct. They shall also make, from time to time, inspections of all other domestic animals within the limits of their several cities and towns whenever they have knowledge or reason to suspect that such animals are affected with or have been exposed to any contagious disease, and they shall immediately inspect any and all domestic animals, and any barn, stable, or other premises where any such animals are kept, whenever directed to do so by the Board of Cattle Com-



missioners or any of its members: *Provided, however,* That nothing in this act shall apply to the inspection of sheep or swine slaughtered in wholesale slaughtering establishments or to the obtaining of a license for the slaughtering of such sheep or swine.

SEC. 23. Whenever an inspector is convinced by examination of any neat cattle, sheep, or swine that such animals are free from contagious disease, he shall deliver to the owner or to the person in charge thereof a written certificate of their condition, signed by him, which certificate shall be in such form as the Board of Cattle Commissioners shall prescribe, and shall cause a copy of said certificate to be entered upon his records.

SEC. 24. Whenever any inspector, upon an examination of any domestic animal, suspects or has reason to believe that such animal is affected with a contagious disease, he shall immediately cause said animal to be quarantined or isolated upon the premises of the owner or of the person in whose charge it is found, or in such other place or inclosure as he may designate, and shall take such other sanitary measures to prevent the spread of such disease as may be necessary or as shall be prescribed by any order or regulation issued by the Board of Cattle Commissioners. Such inspector shall also deliver to the owner or person in charge of such animal, or to any person having an interest therein, a written notice or order of quarantine signed by him, which notice or order shall be in such form as the Board of Cattle Commissioners shall prescribe, and he shall cause a copy of said notice to be entered upon his records.

SEC. 25. Such notice or order may be served by an officer authorized to serve civil process, or it may be delivered by the inspector to the owner or person having an interest in the animal concerned, or to the person in charge of such animal, or may be left at the last and usual place of abode of such owner or person, or may be posted upon the premises where said animal is quarantined or isolated, and a copy of said notice or order of quarantine, with the return of said officer or inspector thereon that such service has been made, shall be competent evidence in any court that such quarantine has been imposed. Whenever any animal has been quarantined by an inspector under the provisions of this act, such animal shall remain in quarantine until the further order of the Board of Cattle Commissioners or of any of its members.

SEC. 26. When any animals are quarantined, collected, or isolated under the provisions of this act upon the premises of the owner or of the person in possession thereof at the time such quarantine is imposed, the expense thereof shall be paid by such owner or person in possession; but whenever specific animals are quarantined or isolated, under the provisions of Section 6 or Section 24 of this act, more than ten days upon such premises, as suspected of being affected with a contagious disease, and the owner is forbidden to sell any of the product thereof for food, or whenever any animals are quarantined, collected, or isolated on any premises other than those of such owner or person in possession thereof, the expense of such quarantine shall be paid by the Commonwealth.

SEC. 27. Whenever any inspector has caused any domestic animal to be quarantined, as provided in Section 24 of this act, he shall immediately give a written notice thereof, together with a copy of the order of quarantine, to the Board of Cattle Commissioners, and shall give such information to no other person.

SEC. 28. For the purpose of inspecting or examining any animal under the provisions of this act any inspector, duly qualified, may enter any building or buildings or any part thereof, inclosure or inclosures, or other place where any such animal is kept, and may examine or inspect the same. Any person who prevents, obstructs, or interferes with any such inspector, or other person having the power and authority conferred upon inspectors under this act, in the performance of any of his duties as provided herein, or who shall hinder, obstruct, or interfere with his making any such inspection or examination, or who shall secrete or remove



any animal for the purpose of preventing the same from being inspected or examined under the provisions of this act, shall be punished by fine not exceeding \$100, or by imprisonment in jail not exceeding sixty days, or by both such fine and imprisonment.

SEC. 29. It shall be the duty of inspectors, in addition to their inspections of animals for contagious diseases, to examine the barns, stables, or other inclosures in which neat cattle are kept, with reference to their situation, cleanliness, light, ventilation, and water supply, and the general condition and cleanliness of the said neat cattle, and to make a detailed report, with names and residences of owners, to the Board of Cattle Commissioners, who shall embody the same in its annual report to the Legislature.

SEC. 30. One-half of the compensation of inspectors of animals appointed under the provisions of Sections 17 and 18 of this act, in cities and towns of less than \$2,500,000 valuation, shall hereafter be paid from the Treasury of the Commonwealth: *Provided, however,* That no inspector shall receive from the Commonwealth more than \$250 as compensation in any one year.

SEC. 31. Every inspector of animals appointed under the provisions of this act shall carry out and enforce all lawful regulations, orders, and directions of the Board of Cattle Commissioners or of any of its members, and any such inspector who neglects or refuses to carry out the same shall be punished by a fine not exceeding \$500 for every such offense.

SEC. 32. Every animal quarantined or isolated by order of the Board of Cattle Commissioners or any of its members or agents, or of any inspector, in accordance with the provisions of this act, shall, during the continuance of such quarantine or isolation, be deemed to be affected with a contagious disease. Any person who shall knowingly break or authorize or cause to be broken any quarantine imposed under the provisions of this act, or who, contrary to such order of quarantine or isolation, shall knowingly remove, authorize, or cause to be removed from any building, place, or inclosure where the same is quarantined or isolated any animal, or who, contrary to any order or notice of quarantine, shall knowingly place or cause or authorize to be placed any other animal or animals within a building, place, or inclosure where any animal or animals are quarantined, or in contact therewith, or who shall knowingly conceal, sell, remove, or transport, or knowingly cause or authorize to be concealed, sold, removed, or transported any animal, knowing or having reasonable cause to believe that such animal is affected with a contagious disease, or who shall knowingly authorize or permit any such animal to go at large upon any way, street, or highway within the limits of this Commonwealth, or who shall knowingly bring or authorize or permit to be brought from any other country, State, district, or Territory into this Commonwealth any animal which is affected with or has been exposed to any contagious disease, or who shall disobey any lawful order or regulation of the Board of Cattle Commissioners or any of its agents, or of any inspectors in the discharge of his or their duty under the provisions of this act, shall be punished by fine not exceeding \$500, or by imprisonment not exceeding one year, or by both such fine and imprisonment.

SEC. 33. If the owner who is entitled to compensation under Section 8 of this act for an animal destroyed as being affected with tuberculosis and the commissioner condemning the same, can not agree as to the value of the animal so condemned the value shall be determined by arbitrators, one to be selected by the commissioner and one to be selected by the owner; or if the owner neglects or refuses for twenty-four hours to select an arbitrator the one already selected shall select a second, and if these two can not agree a third shall be selected by the two arbitrators first selected. Such arbitrators shall be sworn faithfully to discharge the duties of their office, and shall determine the value of such animal according to the provisions of Section 8; and the full value so determined shall be paid to

the owner as provided in said section. Either party aggrieved by the doings of the Cattle Commissioners or any of its members under the provisions of said Section 8, or by the award of such arbitrators, may petition the superior court for the county where such animal was killed, or for the county of Suffolk, to have the damages assessed. Such petition shall be by or against the Board of Cattle Commissioners, and a copy thereof shall be served upon the defendant, or, if the petition is against said Board of Cattle Commissioners, upon one of the commissioners, in the same manner as is provided for the service of other civil process. The petition shall be filed in the clerk's office of the superior court for said county within thirty days after the killing of such animal or animals. The petition shall be subject to the provisions of Section 69 of Chapter 167 of the Public Statutes, and a trial may be had thereon at the bar of the court, in the same manner as other civil cases are tried. If upon such trial it shall be determined that such animal was not affected with the disease for which it was condemned, reasonable compensation may be recovered therefor, and if the owner recovers damages in excess of the amount previously awarded to him by the arbitrators or allowed him by the commissioners he shall recover his costs; otherwise he shall pay costs. The damages, costs, and expenses incurred by the commissioners in prosecuting or defending any such action shall be paid by the Commonwealth.

SEC. 34. Every person who kills or causes to be killed, with the consent of the owner or person in possession thereof, any animal under suspicion that the same is affected with or has been exposed to a contagious disease, or who upon the inspection of the carcass thereof finds or is of the opinion that the same is affected with a contagious disease, shall notify such owner or person in possession thereof of the existence of such disease, and shall also immediately notify the Board of Cattle Commissioners, its agent or inspector, of the same and of the place where the animal was found, the name of the owner or owners or person or persons in possession thereof, and of the disposal made of such carcass. Any person violating the provisions of this section shall be subject to the same penalties as are provided in Section 28 of this act.

SEC. 35. Contagious diseases under the provisions of this act shall include glanders, farcy, contagious pleuropneumonia, tuberculosis, Texas fever, foot-and-mouth disease, rinderpest, hog cholera, rabies, anthrax or anthracoid diseases, sheep scab, and actinomycosis.

SEC. 36. Any person who fails to comply with a regulation made or an order given by the Board of Cattle Commissioners or by any of its members, in the discharge of its or his duty, shall be punished by a fine not exceeding \$500 or by imprisonment not exceeding one year.

SEC. 37. Prosecutions under this act shall be instituted and maintained in the county where the offense was committed.

SEC. 38. No Texan, Mexican, Cherokee, Indian, or other cattle which the Cattle Commissioners decide may spread contagious disease shall be driven, contrary to any order of the Board of Cattle Commissioners, on the streets of any city, town, or village, or on any road in this Commonwealth, or outside the stock yards connected with any railroad in this Commonwealth.

SEC. 39. In all stock yards within this Commonwealth said Texan, Mexican, Cherokee, Indian, or other cattle which the commissioners decide may spread contagious disease shall be kept in different pens from those in which other cattle are kept.

SEC. 40. Any person or persons violating the provisions of the two preceding sections shall be punished by a fine of not less than \$20 nor more than \$100.

SEC. 41. Courts of equity in term time or vacation may, by injunction or other proper order, upon application of the Board of Cattle Commissioners, enforce or restrain violations of the provisions of this act.

SEC. 42. The use of tuberculin as a diagnostic agent for the detection of the

disease known as tuberculosis in domestic animals shall be restricted to cattle brought into the Commonwealth from any point without its limits and to all cattle at Brighton, Watertown, and Somerville: *Provided, however,* That tuberculin may be used as such diagnostic agent on any animal or animals in any part of the State on the consent in writing of the owner or person in possession thereof, and upon any animals condemned as tuberculous upon physical examination by a competent veterinary surgeon.

SEC. 43. No person having animals tested with tuberculin shall be entitled to compensation from the Treasury of the Commonwealth for any animals which react to the tuberculin test unless such testing be done by the Board of Cattle Commissioners or by its authorized agent acting as such at the time of the tests, and such testing shall be subject to the supervision and control of the Board of Cattle Commissioners.

SEC. 44. No compensation shall be allowed by the Commonwealth to any owner or owners of condemned cattle who have failed to comply with any and all reasonable regulations in regard to cleanliness, ventilation, light, disinfection, and water supply which may have been imposed by the Board of Cattle Commissioners. Any owner or owners of cattle who shall refuse to comply with any of such regulations shall be punished by fine not exceeding \$50 for each offense.

SEC. 45. The existing Board of Cattle Commissioners shall, until the appointment of the new board authorized by this act, exercise the powers and discharge the duties conferred and imposed by this act upon the Board of Cattle Commissioners, and thereafter the new Board of Cattle Commissioners shall exercise said powers and discharge said duties.

SEC. 46. No expense shall be incurred and no money expended under this act in excess of the appropriations made therefor.

SEC. 47. Sections 1 to 9, both inclusive, 27, 29, 30, 34 to 48, both inclusive, and 50 to 58, both inclusive, of Chapter 491 of the year 1894; Sections 1, 2, 9 to 12, both inclusive, and 14 of Chapter 496 of the acts of the year 1895; Chapter 276 of the acts of the year 1896; Chapter 499 of the acts of the year 1897; Chapter 451 of the acts of the year 1898, and all other acts and parts of acts inconsistent herewith are hereby repealed.

#### PROCEEDINGS AND REGULATIONS.

June 12 the board sent the following letter to the mayors of cities and selectmen of towns:

COMMONWEALTH OF MASSACHUSETTS,  
BOARD OF CATTLE COMMISSIONERS,  
*Boston, June 12, 1899.*

DEAR SIR: Herewith find a copy of Chapter 408 of the acts of 1899. This act recodifies the laws relating to the contagious diseases of animals.

You will see by Section 17 that there shall be appointed, within thirty days after the passage of this act and thereafter annually in the month of March, an inspector or inspectors of animals. Will you therefore immediately appoint an inspector of animals, or more than one if you think it necessary?

In most cities and towns, it seems to us, one inspector of animals is sufficient.

You will further note that such appointments are subject to the approval of the Board of Cattle Commissioners.

This board prefers that a competent veterinary surgeon be appointed to this position when one resides in the locality and his services can be procured. Any unfit appointees will be rejected by this board.

You will please notify the Board of Cattle Commissioners at once upon making the appointment.



Section 20 provides that the licensing of slaughterhouses and the inspection of animals killed for food, as provided for in Chapter 491, acts of 1894 and acts in amendment thereto, shall hereafter be attended to by local boards of health.

AUSTIN PETERS, *Chairman*,

LEANDER F. HERRICK, *Secretary*,

CHARLES A. DENNEN,

*Board of Cattle Commissioners.*

The work relative to Tuberculosis is classified by the board under the following heads:

1. The supervision of the traffic in live cattle brought into the State.
2. A general inspection, the examination of cattle quarantined as diseased by the local inspectors in the various cities and towns, and the payment for those found to be infected with tuberculosis.
3. Testing entire herds for the purpose of permanently eradicating tuberculosis from the premises.

Under the first head are the cattle brought into the State through the quarantine yards at Watertown, Brighton, and Somerville and those brought in on permits to other points.

The first step necessary for continuing the control of the cattle business was to readopt the order of the previous board; therefore, at a meeting of the Board of Cattle Commissioners, held June 26, the following order was adopted:

COMMONWEALTH OF MASSACHUSETTS,

BOARD OF CATTLE COMMISSIONERS,

*Boston, June 26, 1899.*

*To all persons whom it may concern:*

By virtue of the power and authority in us vested by law, and especially under the provisions of Chapter 408 of the acts of the year 1899, you are hereby notified that tuberculosis, which is a contagious disease, and is so recognized under the laws of this Commonwealth, exists among cattle of the several States and Territories of the United States, the District of Columbia, and Canada, and such localities are, in the opinion of this board, infected districts.

You are hereby further notified that, in order to prevent the importation of diseased animals, and as a means of suppressing such diseases within this Commonwealth, this board has passed the following order:

First. No neat cattle brought from any State or Territory of the United States, the District of Columbia, Canada, or any other country without the limits of this Commonwealth, shall be brought within the limits of this Commonwealth, except for delivery directly to the Union Stock Yards in the town of Watertown, the Boston and Albany Stock Yards in Brighton, within the city of Boston, or the premises of the New England Dressed Beef and Wool Company in the city of Somerville, except upon a permit signed by the Board of Cattle Commissioners or some one of its members; and no neat cattle so brought for delivery at any of said points shall be unloaded, except in case of accident, at any point other than the said Boston and Albany Stock Yards in Brighton, the Union Stock Yards in Watertown, or the New England Dressed Beef and Wool Company in Somerville.

Second. All neat cattle brought within the limits of this Commonwealth from any place designated in paragraph 1 hereof, except for delivery as provided in the preceding paragraph, must be accompanied by a permit issued by this board or some member thereof; and you are hereby forbidden to receive for transportation animals other than those designated in such permit.

Third. If, for any cause, any such neat cattle are received by any of your agents within the limits of this Commonwealth at any other than the Union Stock Yards



in Watertown, the Boston and Albany Stock Yards in Brighton, or the New England Dressed Beef and Wool Company in Somerville, not accompanied by a permit, as provided in paragraph 2 hereof, you will immediately notify this office, giving the place where said animals were received for shipment, the name of the consignee, and destination of said animals.

You will not remove said animals or permit them to be removed from the car or vehicle in which they are contained without a permit from this board or some member thereof; except that if, by reason of the crowded condition of the car or because of the long confinement of said animals within the same, or for accident or otherwise, it is deemed expedient by you or your agent to unload the same, such animal or animals may be removed by you from said car or vehicle without such permit; but in such case you will notify this office, and you will not allow said animal or animals to go out of the possession of your agent or off of your premises where said animals are unloaded except upon obtaining such permit.

Fourth. All neat cattle brought within the limits of the premises to Brighton, Watertown, and Somerville, designated in paragraph 1 hereof, are hereby declared to be quarantined.

Fifth. Any person violating the provisions of this order will be punished as provided in Section 36 of Chapter 408 of the acts of the year 1899.

This order shall take effect upon the 26th day of June, 1899. •

AUSTIN PETERS, *Chairman*,  
LEANDER F. HERRICK, *Secretary*,  
CHARLES A. DENNEN,  
*Board of Cattle Commissioners.*

The Board of Cattle Commissioners require all persons bringing cattle into this State, except calves under 6 months old or beef cattle for immediate slaughter, to have them tested with tuberculin prior to shipment or after arrival in this State, unless special permission to the contrary is given by this board.

All persons shipping or driving cattle into Massachusetts must have a permit, unless sent by rail to one of the quarantine stations at Brighton, Watertown, or Somerville.

In regard to the admission of cattle from without the State, it is the opinion of this board that the quarantine stations should be maintained with rules and regulations still more stringent; otherwise this market would be flooded with tuberculous cattle from other States, for which the purchasers would soon after look to the Commonwealth for payment.

While the board does not feel that the work of testing out-of-the-State cattle is by any means perfect, yet it does feel that there has been a great improvement over the old methods of admitting all classes of cattle within the borders of the State.

Many of the buyers affirm that they have had less trouble with their cattle during the last two or three years than ever before; therefore the board believes it to be good judgment not to relax this work in the slightest degree.

The second portion of the work includes that coming under the general inspection made by the local inspectors.

An order for an examination of the neat stock in the State and the premises on which they were kept was sent out in the following letter to inspectors, October 1:

*To the Inspectors of Animals:*

The Board of Cattle Commissioners hereby directs that you shall make a general inspection of the neat stock in your town, and incidentally other farm animals, to commence at once and to be completed on or before the 15th day of November.

The law under which you work is Chapter 408 of the Acts of 1899, a copy of which will be sent you, together with the necessary papers for carrying it out. The portion contained in Sections 19 to 32 relates especially to your duties, and you should make yourself familiar with it. You will also be provided with a book to carry out the provisions of Section 23, with books to carry out the provisions of Section 29, and a quarantine book for cases of tuberculosis or other contagious diseases among animals.

Cattle are not to be quarantined as tuberculous unless they show enough evidence of disease to make it possible to condemn them on a physical examination, except where the udder of a milch cow is tuberculous; on no account are cattle to be quarantined simply for the purpose of testing them with tuberculin, when they show no physical signs of disease. The only exception to this rule is, that it is the duty of inspectors to quarantine all cattle brought into the State without a permit from this board, until the owner furnishes the cattle commission with satisfactory certificates of a tuberculin test. Before quarantining any cattle, you should decide upon what cows you are going to quarantine, then send the papers on a number at once, so our agent can see them all in one visit.

By order:

AUSTIN PETERS, *Chairman,*

L. F. HERRICK, *Secretary,*

C. A. DENNEN,

*Massachusetts Board of Cattle Commissioners.*

The present policy of the Massachusetts Board of Cattle Commissioners follows the plan laid down in the resolutions<sup>1</sup> given above, outside of the matter of slaughterhouse inspection.

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<sup>1</sup> The resolutions referred to, as translated by Dr. V. A. Nörgaard, are as follows:

V.—*The prevention of tuberculosis among domestic animals.*

1. All meat inspectors must report every case of tuberculosis which results in total or partial condemnation of the carcass, and all such which are deemed to have been especially effective in disseminating the infection.

2. Investigation as to the origin of the animal in question.

3. Examination of the herd to which it belonged. All cattle showing clinical symptoms of tuberculosis should be branded or otherwise marked.

4. Separation and slaughter in from one to three months of all animals which must be considered dangerous in spreading the disease, under penalty of losing all right to indemnification, but under promise of indemnity in full in case of mistake in the diagnosis.

5. Thorough disinfection of the stable and premises where the affected animals have been kept.

6. Careful removal and destruction of all affected parts of the carcass.

7. Quarterly inspection of all affected herds.

8. Milk from cows with tuberculosis mammitis must be used for either man or animal in boiled condition only.

9. Skim milk from cooperative dairies must be returned or sold in sterilized condition only.

10. Absolute destruction of all separator residues.

11. Permanent supervision, in regard to tuberculosis, with all dairies which make a specialty of providing milk for children and invalids.

VI.—*The utilization of the flesh and milk of tuberculous animals.*

OF THE FLESH.

When a general compulsory inspection of all food animals, before and after slaughter, has been inaugurated, the following rules are to be enforced in order to

The methods formerly pursued by the State have been found too extravagant and expensive. Similar measures were tried in Belgium, and proved there to be too costly.

During the past year cows that showed marked physical evidence of tuberculosis were condemned and killed; a few have been passed as fit for beef, but most of them were only fit to be rendered. When cows can be condemned on a physical examination the work can be done at a less cost than under the former system, when the agent tested cows with tuberculin and then reported the results to the office and received instructions which to kill and which to release.

Under the present system the agent examines, appraises, and kills a diseased cow all at one visit. This system seems to work satisfactorily, and very few complaints have arisen under it.

Cows with nodulated udders have been tested with tuberculin, as have also some doubtful cases; if they reacted they were destroyed.

Reducing the limit of value from \$60 to \$40 has resulted in a saving to the State. The appraisals have been very evenly made, and the average value, \$22.50 per head, is much lower than it formerly was. The work of the local inspectors seems to be sufficient to protect the people from the milk of cows owned in Massachusetts which are sufficiently diseased to be a danger to the public health, besides which, the badly diseased cows are the greater sources of danger to others.

eliminate the dangers which under certain circumstances might result from the consumption of flesh from tuberculous animals:

(1) In examining the carcasses of slaughtered animals it is necessary that all the professional inspectors follow certain rules which will insure that every case of tuberculosis is discovered and that the extent of the tuberculous lesions are ascertained.

(2) Of greatest importance is the unfailing discovery and the careful removal of the affected organs, together with their appendages.

(3) When tubercular centers are located in the flesh, the infected regions, as bounded by the surrounding lymph glands, are to be treated in the same way as the infected organs—that is, when it can be ascertained beyond a doubt that infection is limited to a certain region.

When the tuberculous alterations in the meat are confined to the lymph glands located therein, the muscle parts may be dissected away from the bones, joints, blood vessels, and lymphatics, and when cut in small pieces and thoroughly sterilized be offered for sale as food.

In the case of fat animals the melting out of the fatty tissue is allowed when care is taken to remove the tuberculous centers.

(4) In all cases of local tuberculosis, or in such where the generalization is limited in extent and confined to the internal organs, the meat may be offered for sale in raw condition. When, however, the tuberculous processes are of considerable extent, the meat should be sold under declaration.

(5) In all cases where there is pronounced emaciation or symptoms of recent generalization (swelling of the spleen and lymphatic glands or miliary tuberculosis of the spleen, liver, lungs, and kidneys), the whole of the meat, with exception of the melted fat, must be condemned as unfit for human food.

(6) In cases where the local character of tuberculosis and the harmlessness of the meat are doubtful (especially when there are tuberculous caverns and incipient derangement of nutrition), the whole of the meat is to be sterilized before being handed over as fit for food.

(7) The sterilized meat and the melted fat are to be sold under declaration.

#### OF THE MILK.

(1) Cows, goats, and other animals kept for dairy purposes must be subjected to regular veterinary control.

(2) The milk of tuberculous animals is not to be used for human food if the animals are emaciated or affected with tuberculosis of the udder.

(3) All emaciated animals and those suffering from tuberculosis of the udder should be destroyed without delay, as it is now done in Denmark and Sweden, and the owners indemnified by the State.

COMMONWEALTH OF MASSACHUSETTS,  
BOARD OF CATTLE COMMISSIONERS.

PERMIT TO BRING NEAT CATTLE INTO MASSACHUSETTS, TO ALL POINTS EXCEPT  
THE QUARANTINE STATIONS AT BRIGHTON, WATERTOWN, AND SOMERVILLE.

BOSTON, MASS., ———, 1900.

Permission is hereby granted to ———, of ———, to bring from ———, to ———,  
Mass., ——— on or before ———, 1900.

——— to be tested before shipment.

——— to be tested after arrival at destination.

——— for immediate slaughter.

——— returning from out of State pastures.

——— ———,  
*Commissioner.*

THE PERMIT SHOULD ACCOMPANY WAYBILL.

All persons bringing cattle into this State, except calves under 6 months old or beef cattle for immediate slaughter, must have them tested with tuberculin prior to shipment or after arrival in this State, unless special permission to the contrary is given by this board.

Certificates of tuberculin test must be mailed at once directly to the Massachusetts Cattle Commissioners. Cattle brought into Massachusetts on permit are to remain in quarantine on owner's or consignee's premises until released by the inspector of animals of the town to which they are sent, or by order of the Board of Cattle Commissioners or one of its members or agents.

All persons shipping or driving cattle into Massachusetts must have a permit unless sent by rail to one of the quarantine stations named above.

The following is a notice to inspectors of the permit, as shown above, being issued to importers:

No. ———.

COMMONWEALTH OF MASSACHUSETTS,  
BOARD OF CATTLE COMMISSIONERS,  
*Boston, ———, 1900.*

——— ———, Inspector of Animals,

———, Mass.

DEAR SIR: We have this day issued a permit to ——— ——— to bring ——— cattle to your town. Upon arrival of same you will please notify this board on blank provided below, and if they have not been tested with tuberculin we will order them quarantined until the owner has them so tested, at his expense and risk, by some one satisfactory to us.

Yours, truly,

——— ———,  
*Chairman.*

———, MASS., ———, 1900.

TO MASSACHUSETTS CATTLE COMMISSIONERS:

I hereby notify you of the arrival of ——— cattle brought into the State by Mr. ——— ———, on permit issued by you as above stated.

Remarks: ———.

Yours, truly,

——— ———,  
*Inspector of Animals for said town.*

MICHIGAN.

Michigan has a general law concerning contagious or infectious diseases of a malignant character, but no special law relative to bovine tuberculosis. The State Veterinarian is doing something against tuberculosis under this law, as will be seen by a reference to the regulations.



The work against contagious diseases of animals is done by a State Live Stock Sanitary Commission, consisting of three persons appointed by the Governor. The Governor also appoints a State Veterinary Surgeon.

The commission is "authorized and empowered to establish, maintain, and enforce such quarantine, sanitary, and other regulations as it may deem necessary."

It is made the duty of any person who has knowledge of the existence or the suspicion of existence of any contagious or infectious disease to report it to the commission. Upon the receipt of such information the commission or any member of it shall, if satisfied that such disease does exist, establish temporary quarantine and prescribe such regulations as will prevent the spread of the contagion or infection, and shall notify the State Veterinarian, who shall make an examination and report the result to the commission. The commission shall then prescribe rules and regulations for controlling the diseases and prescribe the lines of a quarantine district. The Governor establishes the quarantine by proclamation.

The commission is empowered to destroy affected or exposed animals after appraisement. A certificate of such appraisement is issued to the owner and the full amount is paid upon approval by the Governor. The right to indemnity does not extend to animals which may have been brought into the State in a diseased condition or which may come from a State or Territory where the disease with which the animals are affected exists, nor to animals brought into the State in violation of law or rules and regulations, or that were diseased or suspected of being diseased when they come into possession of the claimant.

It is made a misdemeanor to keep, sell, ship, drive, trade, or give away any animal having a contagious or infectious disease. It is also a misdemeanor to bring such animals into the State.

The Governor, when he has reason to believe that contagious or infectious diseases exist in other States or Territories, may issue a proclamation of quarantine in regard to such districts prohibiting the importation into Michigan of animals therefrom unless accompanied by a certificate of health.

The commission is empowered to cooperate with the Bureau of Animal Industry in the work of suppression and prevention of contagious diseases.

#### LAW.

AN ACT to provide for the appointment of a Live Stock Sanitary Commission and a State Veterinarian, and to prescribe their powers and duties, and to prevent and suppress contagious and infectious diseases among the live stock of the State. (Approved June 10, 1885. Section 23 added by act approved May 13, 1887.)

SECTION 1. *The people of the State of Michigan enact*, That a commission is hereby established which shall be known under the name and style of "The State Live Stock Sanitary Commission." The commission shall consist of three commissioners who are practical agriculturists and engaged in the live-stock indus-

tries of the State, who shall be appointed by the Governor, with the advice and consent of the Senate. One shall be appointed for the term of six years, one for the term of four years, and one for the term of two years, whose term of office shall commence on the second Tuesday of July of the year in which they are appointed and shall continue until their successors are appointed and qualified. And at each succeeding biennial session of the Legislature there shall be appointed in like manner one commissioner who shall hold his office six years, or until his successor is appointed and qualified. The Governor shall also appoint, with the advice and consent of the Senate, a competent and skilled veterinary surgeon for the State, who, at the time of such appointment, shall be a graduate in good standing of a recognized college of veterinary surgery, and who shall hold his office two years from the second Tuesday of July of the year he is appointed and until his successor is appointed and qualified. The Governor shall also appoint every two years thereafter a competent and skilled veterinarian having the qualifications above mentioned, whose term of office shall be for two years, or until his successor is appointed and qualified.

SEC. 2. Said commissioners and veterinary surgeon before they enter upon the duties of their office shall each take and subscribe the constitutional oath of office and file the same with the Secretary of State.

SEC. 3. Each commissioner shall receive the sum of \$3 per day and necessary expenses for the time actually spent in the discharge of his duties; and the veterinary surgeon shall receive the sum of \$5 per day and necessary expenses for time when employed.

SEC. 4. It shall be the duty of the commission to protect the health of the domestic animals of the State from all contagious or infectious diseases of a malignant character, and for this purpose it is hereby authorized and empowered to establish, maintain, and enforce such quarantine, sanitary, and other regulations as it may deem necessary.

SEC. 5. [As amended by Act No. 105, Public Acts, 1887.] It shall be the duty of any person who discovers, suspects, or has reason to believe that any domestic animal belonging to him or in his charge, or that may come under his observation belonging to other parties, is affected with any disease, whether it be a contagious or infectious disease, to immediately report such fact, belief, or suspicion to the Live Stock Sanitary Commission, or a member thereof.

SEC. 6. [Section 6 was repealed by Act No. 105, Public Acts, 1887.]

SEC. 7. The commission or any member thereof to whom the existence of any infectious or contagious disease of domestic animals is reported shall forthwith proceed to the place where such domestic animal or animals are and examine the same, and if in his or their opinion any infectious or contagious disease does exist he or they shall prescribe such temporary quarantine and regulations as will prevent the spread of the contagion or infection, and notify the State Veterinarian, who shall forthwith proceed to the place where said contagious or infectious disease is said to exist and examine said animal or animals and report his or their finding to the said commission, who then shall prescribe such rules and regulations as in their judgment the exigencies of the case may require for the effectual suppression and eradication of the disease, and for that purpose the said commission may list and describe the domestic animals affected with such disease and those which have been exposed thereto and included within the infected district or premises so defined and quarantined with such reasonable certainty as would lead to their identification, and no domestic animal liable to become infected with the disease or capable of communicating the same shall be permitted to enter or leave the district, premises, or grounds so quarantined, except by the authority of the commission. The said commission shall also, from time to time, give and enforce such directions, and prescribe such rules and regulations as to separating, mode of handling, treating, feeding, and caring for such diseased and exposed animals

as it shall deem necessary to prevent the two classes of animals from coming in contact with each other, and perfectly isolate them from all other domestic animals which have not been exposed thereto and which are susceptible of becoming infected with the disease, and the said commission and veterinarian are hereby authorized and empowered to enter upon any grounds or premises to carry out the provisions of this act. When in the opinion of the commission it shall be necessary, to prevent the further spread of any contagious or infectious disease among the live stock of the State, to destroy animals affected with or which have been exposed to any such disease, it shall determine what animals shall be killed, and appraise the same, as hereinafter provided, and cause the same to be killed and the carcasses disposed of as in their judgment will best protect the health of domestic animals of the locality.

SEC. 8. When the commission shall have determined the quarantine and other regulations necessary to prevent the spread among domestic animals of any malignant, contagious, or infectious disease found to exist among the live stock of the State, and given their order as hereinbefore provided, prescribing quarantine and other regulations, it shall notify the Governor thereof, who shall issue his proclamation proclaiming the boundary of such quarantine and the orders, rules, and regulations prescribed by the commission, which proclamation may be published by written or printed handbills posted within the boundaries or on the lines of the district, premises, places, or grounds quarantined: *Provided*, That if the commission decide that it is not necessary, by reason of the limited extent of the district in which such disease exists, that a proclamation should be issued, then none shall be issued; but such commission shall give such notice as may to it seem best to make the quarantine established by it effective.

SEC. 9. Whenever the commission shall direct the killing of any domestic animal or animals, it shall be the duty of the commissioners to appraise the animal or animals condemned, and in fixing the value thereof the commissioners shall be governed by the value of said animal or animals at the date of appraisement.

SEC. 10. Whenever any live stock shall be appraised and killed by order of the commission, it shall issue to the owner of the stock so killed a certificate showing the number and kind of animals killed and the amount, in their judgment, to which the owner is entitled, and report the same to the Governor of the State, which certificate, if approved by the Governor, shall be presented to the Auditor-General, who shall draw his warrant on the State Treasurer for the amount therein stated, payable out of any money in the Treasury not otherwise appropriated.

SEC. 11. When any animal or animals are killed under the provisions of this act by order of the commission, the owner thereof shall be paid therefor the appraised value, as fixed by the appraisement hereinbefore provided for: *Provided*, The right of indemnity on account of animals killed by order of the commission under the provisions of this act shall not extend to the owners of animals which have been brought into the State in a diseased condition, or from a State, country, Territory, or district in which the disease with which the animal is affected, or to which it has been exposed, exists. Nor shall any animal be paid for by the State which may be brought into the State in violation of any law or quarantine regulation thereof, or the owner of which shall have violated any of the provisions of this act, or disregarded any rule, regulation, or order of the Live Stock Sanitary Commission or any member thereof. Nor shall any animal be paid for by the State which came into the possession of the claimant with the claimant's knowledge that such animal was diseased, or was suspected of being diseased, or of having been exposed to any contagious or infectious disease.

SEC. 12. Any person who shall have in his possession any domestic animal affected with any contagious and infectious disease, knowing such animal to be so affected, or after having received notice that such animal is so affected who shall permit such animal to run at large, or who shall keep such animal where



other domestic animals not affected by or previously exposed to such disease may be exposed to its contagion or infection, or who shall sell, ship, drive, trade, or give away such diseased animal or animals which have been exposed to such infection or contagion, or who shall move or drive any domestic animal in violation of any direction, rule, or regulation, or order establishing and regulating quarantine, shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be fined in any sum not less than \$10 nor more than \$500 for each of such diseased or exposed animal's which he shall permit to run at large, or keep, sell, ship, drive, trade, or give away in violation of the provisions of this act: *Provided*, That any owner of any domestic animal which has been affected with or exposed to any contagious disease may dispose of the same after having obtained of the State Veterinarian a certificate of health for such animal.

SEC. 13. Any person who shall knowingly bring into this State any domestic animal which is affected with any contagious or infectious disease, or any animal which has been exposed to any contagious or infectious disease, shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be fined in any sum not less than \$100 nor more than \$5,000.

SEC. 14. Any person who owns or is in possession of live stock which is affected, or which is suspected or reported to be affected, with any infectious or contagious disease, who shall wilfully prevent or refuse to allow the State Veterinarian or commissioner or other authorized officer or officers to examine such stock, or shall hinder or obstruct the State Veterinarian or other authorized officer or officers in any examination of or in an attempt to examine such stock, shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be fined in any sum not less than \$10 nor more than \$500.

SEC. 15. Any person who shall wilfully violate, disregard, or evade, or attempt to violate, disregard, or evade any of the provisions of this act, or who shall wilfully violate, disregard, or evade any of the rules, regulations, orders, or directions of the Live Stock Sanitary Commission establishing and governing quarantine, shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be fined in any sum not less than \$10 nor more than \$500.

SEC. 16. The commission provided for in this act shall have power to employ at the expense of the State such persons and purchase such supplies and material as may be necessary to carry into full effect all orders by it given.

SEC. 17. The commissioners shall have power to call upon any sheriff, undersheriff, deputy sheriff, or constable to execute their orders, and such officers shall obey the orders of said commissioners; and the officers performing such duties shall receive compensation therefor as is prescribed by law for like services, and shall be paid therefor in like manner. And any officer may arrest and take before any justice of the peace of the county any person found violating any of the provisions of this act, and such officer shall immediately notify the prosecuting attorney of such arrest, and he shall prosecute the person so offending according to law.

SEC. 18. Whenever the Governor of the State shall have good reason to believe that any dangerous, contagious, or infectious disease has become epizootic in certain localities in other States, Territories, or countries, or that there are conditions which render such domestic animals from such infected districts liable to convey such disease, he shall by proclamation prohibit the importation of any live stock of the kind diseased into the State, unless accompanied by a certificate of health given by a duly authorized veterinary surgeon; and all such animals arriving in this State shall be examined immediately by the commission or some member thereof, and if he or they deem necessary he or they shall have said animals inspected by the State Veterinary Surgeon, and if, in his opinion, there is any danger from contagion or infection they shall be placed in close quarantine until such danger of infection or contagion is passed, when they shall be released by order of said commission, or some member thereof.



SEC. 19. For the purposes of this act each member of the Live Stock Sanitary Commission is hereby authorized and empowered to administer oaths and affirmations.

SEC. 20. This commission is hereby authorized and required to cooperate with any board or commission acting under any present or future act of Congress for the suppression and prevention of contagious or infectious diseases among domestic animals, and the same right of entry, inspection, and condemnation of diseased animals upon private premises is granted to the United States board or commission as is granted to the commission granted under this act.

SEC. 21. The commission shall make biennially a detailed report of its doings to the Governor, which report shall be transmitted to the Legislature at its regular biennial session.

SEC. 22 [as amended by Act No. 47, Public Acts of 1887]. This act shall be construed so as to include sheep and horses.

Ordered to take immediate effect.

SEC. 23. [Section 23 was added by act approved May 13, 1887.] Any railroad company, navigation company, or other corporation, or common carrier, who shall knowingly or wilfully violate, disregard, or evade any of the provisions of this act, or who shall wilfully violate, disregard, or evade any of the rules, regulations, orders, or directions of the Live Stock Sanitary Commission establishing or governing quarantine, or who shall evade or attempt to evade any quarantine proclamation of the Governor of this State declaring quarantine limits, shall forfeit and pay to the people of the State of Michigan not less than \$500 nor more than \$5,000 for each and every offense, and shall be liable for all damages caused to any neat cattle by its or his failure to comply with the requirements of this act.

This act is ordered to take immediate effect.

#### REGULATIONS.

The work of the Live Stock Sanitary Commission under the law is given in the following words from Dr. George W. Dunphy, State Veterinarian: "We have no special law in regard to tuberculosis, but the live stock sanitary laws of the State give the commission power to make their own regulations in regard to contagious diseases. Their regulations are about as follows: In case of any reports of suspected tuberculosis the State Veterinarian is instructed to apply the tuberculin test, and if any of the animals react to extent of 2 degrees above the highest temperature on the day prior to the injection of tuberculin they are destroyed by order of the commission, and should an animal so destroyed fail to show tubercular lesions the owner shall be paid full value for the animal; but in case the tubercular lesions are present (which is usually the case) the owner receives the nominal sum of \$1, and is paid for killing and burying or burning the carcass. We always make a rigid and complete postmortem, and in at least 90 per cent of the cases where we have reactions the animals are found affected with the disease. We make exceptions to this rule in case of some exceptionally well-bred animals. They are placed in quarantine if the owner requests it, and the produce must be immediately removed from the dam at birth and fed on milk from healthy cows, and at the age of six months we subject them to the tuberculin test, and if they pass the test all right they are allowed to go at large or take their place in the healthy herd."

## MINNESOTA.

The control of contagious diseases of domestic animals in Minnesota is under the State Board of Health and the local boards of health of cities, towns, and villages. Any of these boards, within their respective jurisdictions, may quarantine animals affected with or which have been exposed to contagious or infectious disease. Animals which are found to be affected or which have been exposed to contagion may be killed; such killing, however, to be under certain restrictions and conditions, as mentioned in Section 4 of the act below. Indemnity for any animal so killed, if found to be free of tuberculosis, shall be paid one-fifth by the town, village, or city and four-fifths by the State, at the cash value at the time of killing, as appraised by three disinterested persons.

The expenses of quarantine are divided between the State and the town, village, or city, or assessed against the owner if the quarantine is upon his premises.

The State Board of Health has power to prohibit the arrival or departure from the State and the towns, villages, and cities of any exposed or infected animal; also to adopt rules and regulations to enforce the authority given by the law. The Board is "expressly given authority to regulate or prohibit the shipment into this State of any domestic animal which, in the judgment of said Board, may endanger the public health."

The penalty for violation of the law or any rule or regulation made by the State Board of Health or the local boards of health is a fine of not less than \$25 nor more than \$100, or by imprisonment not less than thirty days nor more than ninety days. Local boards of health shall carry out the rules and regulations of the State Board of Health.

AN ACT to prevent the spread of contagious and infectious diseases among domestic animals in this State. (Approved April 23, 1897.)

*Be it enacted by the Legislature of the State of Minnesota:*

SECTION 1. Authority is hereby given to the State Board of Health and to the several local boards of health of the towns, villages, and cities of this State, to take all steps they may severally deem necessary to control, suppress, and eradicate any and all contagious and infectious diseases among any of the domestic animals in this State, and to that end said boards are hereby severally empowered, within their respective jurisdictions, to quarantine any domestic animal which is infected with any such disease or which has been exposed to infection therefrom; to kill any animal so infected, and, whenever deemed necessary by the State Board of Health, to kill any animal which has been exposed to the infection of any such disease; to regulate or prohibit the arrival in or departure from this State, and the towns, villages, and cities thereof, of any such exposed or infected animal, and at the cost of the owner thereof to detain any domestic animal found in violation of any such regulation or prohibition: to adopt all such rules and regulations as may be by such several boards deemed necessary or expedient to enforce the authority hereby given; and said State Board of Health is hereby expressly given authority to regulate or prohibit the shipment into this State of any domestic animal which, in the judgment of said board, may endanger the public health.

SEC. 2. Any person who knows of, or has reason to suspect, the existence of any contagious or infectious disease in any domestic animal shall forthwith give notice thereof to the local board of health of the town, village, or city where such animal is kept. Within twenty-four hours after any local board of health shall receive notice that any domestic animal is infected with any such disease, or has been exposed thereto, it shall give notice thereof in writing to the State Board of Health.

SEC. 3. All rules and regulations adopted by any board of health under the authority of this act shall be entered upon the minutes of said board and shall be published in the manner therein provided. All regulations now in force adopted by any board of health within this State, under authority of any law existing prior to the passage hereof, relating to the matters covered by this act and not in conflict with this law, are continued in force, and are hereby declared to be the rules and regulations of such several boards under this act until such times as others are adopted.

SEC. 4. No animal shall be killed by any of the boards herein mentioned until it shall first have been adjudged to be infected with a contagious or infectious disease, either by a duly authorized agent of the State Board of Health, or by a physician or veterinary surgeon selected by a local board of health; except that whenever in the judgment of the State Board of Health the control or eradication of a disease renders it advisable to do so, such board may order killed and buried, or otherwise destroyed, any domestic animal which has been exposed to a contagious or infectious disease, although at the time not infected therewith.

*Provided, however,* That cattle in this State shall not be adjudged infected with the disease of tuberculosis or condemned as being so infected except and until such animal has been subjected to at least two separate tuberculin tests to ascertain the presence of such disease, and the time of making such separate tests shall not be nearer together than two months and not farther apart than three months. In all cases to ascertain the presence of such disease the tests aforesaid shall be made by a duly licensed veterinary surgeon under authority of said board of health. And no milk or other products from such animals shall be sold or offered for sale.

SEC. 5. Whenever a domestic animal has been adjusted [adjudged] to be infected with a contagious or infectious disease, and has been ordered killed by the State Board of Health or by a local board of health, the owner or keeper of such animal shall be notified thereof, and within twenty-four hours thereafter he may file a protest with the board of health which has ordered such animal killed against the killing thereof, and shall therein state under oath that to the best of his belief such animal is not infected with any contagious or infectious disease; whereupon, said animal being killed notwithstanding such protest, a postmortem examination thereof shall be made by experts, appointed, one by the board of health, one by the owner, and one by the two already appointed, and if upon such examination said animal shall be found to have been entirely free from contagious or infectious disease, there shall be appointed three competent and disinterested men—one by the board of health, one by the owner of the animal killed, and the third by the two already appointed—to appraise it at its cash value immediately before it was killed, and the amount of such appraisal shall be paid to the owner of such animal, one-fifth part thereof by the town, village, or city where the animal was kept and four-fifths thereof by the State. All appraisements made under this act shall be in writing and signed by the appraisers and certified to by the local board of health and the State Board of Health, respectively, to the Governor of the State and to the treasurer of the several towns, villages, and cities wherein the animals appraised were kept. Whenever any such animal which has not been adjudged to be infected is killed by order of said board, but not by the owner or keeper thereof, a postmortem examination thereof shall be made by experts appointed as



aforesaid, and if found to have been entirely free from any infectious disease the value of such animal shall be determined and paid for as hereinbefore specified, except, as in this section expressly provided, no compensation shall be paid for any animal killed by virtue of any authority given by this act.

SEC. 6. The expense of the killing and burial or destruction of any diseased animal ordered killed by either of the boards aforesaid shall be borne by the town, village, or city where such animal was kept. The expense of the quarantine of any infected animal, or of any animal that has been exposed to infection, shall be paid when taken from the possession of its owner or keeper, shall be borne one-fifth by the town, village, or city where the animal was kept and four-fifths by the State. When any animal is quarantined upon the premises of its owner or keeper, the expense thereof shall be borne by such owner or keeper. Whenever any animal is quarantined when being shipped into the State, the expense thereof shall be borne by its owner or keeper. Whenever the owner or keeper of any domestic animal is liable for any expenses incurred under this act, by any board of health in connection therewith, such board may have a lien on such animal for such expense, and may also maintain an action against such owner or keeper therefor.

SEC. 7. It is hereby made the duty of the several local boards of health in this State to carry out and enforce all orders and directions of the State Board of Health to them directed, and the State Board of Health may require any two or more local boards to act together for the purpose of enforcing any of the provisions of this act.

Whenever the rules and regulations of the State Board of Health made under authority of this act conflict with the rules and regulations made hereunder by any local board of health, those made by the State board shall supersede those made by the local board.

SEC. 8. The State Board of Health or any duly authorized agent thereof may examine or cause to be examined, under oath, all persons believed to possess knowledge of material facts concerning the existence or dissemination or danger of dissemination of disease among domestic animals; and, for this purpose, shall have all the powers vested in justices of the peace to take depositions and to compel witnesses to attend and testify.

SEC. 9. Any person violating any provisions of this act, or any rule or regulation made by the State Board of Health or by any local board of health, or any order made by any such board under the authority hereof, shall be guilty of a misdemeanor and be punished by a fine of not less than \$25 or more than \$100, or by imprisonment for not less than thirty or more than ninety days. Any member of any local board of health who shall neglect or refuse to carry into effect the provisions of this act, or who shall neglect or refuse to carry out any direction of the State Board of Health, or who shall neglect or refuse to enforce any rule or regulation made by the State Board of Health or by any local board of health under the authority hereof, shall be guilty of a misdemeanor and be punished by a fine of not less than \$25 and not more than \$100; and each and every day's neglect or refusal to perform any duty imposed upon him by this act shall constitute a separate and independent misdemeanor. Complaints for violating the provisions of this act, or for violating any rule or regulation made by any board of health under its authority, may be made by any member or authorized agent of any such board or by any citizen of this State.

SEC. 10. Whenever during the prevalence in the State of any contagious or infectious disease among domestic animals the owner shall post on his premises a notice forbidding all persons to enter any building or enclosure on said premises without permission from said owner, it shall be a misdemeanor to enter upon said premises, punishable by a fine of not less than \$25 nor more than \$100, or by imprisonment for not less than thirty nor more than ninety days.



SEC. 11. Whenever during the prevalence in the State of any contagious or infectious diseases among domestic animals the owner shall post on his premises a notice forbidding all persons not authorized by State or local boards of health to enter any building or enclosure on said premises without permission from said owner, it shall be a misdemeanor to enter upon said premises, punishable by a fine of not less than \$25 nor more than \$100, or by imprisonment for not less than thirty nor more than ninety days.

SEC. 12. The sum of \$6,000, or so much thereof as necessary, is hereby annually appropriated for the payment of the expenses that may be incurred by the State in enforcing this act, such expenses to be approved by the State Board of Health and by the Governor.

SEC. 13. Chapter 200 of the General Laws of the State of Minnesota for 1885, as well as all other acts and parts of acts inconsistent with this act, are hereby repealed, except as to any actions now pending growing out of the enforcement of the same.

SEC. 14. This act shall take effect and be in force from and after its passage.

### REGULATIONS.

[Please fill out and return at once—Infectious disease of animals. Minnesota State Board of Health—Office record No. —.]

#### BLANK FOR REPORTING INFECTIOUS DISEASES AMONG ANIMALS.

[This form is to be used by health officers and by chairmen of local boards of health in reporting to the State Board of Health the existence of any infectious disease among animals within their jurisdiction.]

Date —, —, —.

County of —, township of —.

Name and post-office address of health officer or chairman of the local board of health making this report, —.

Owner's name and address, —.

Number of animals that have been exposed to infection, —.

Number of animals of this kind on the farm, —.

Number and kind of animals sick, —.

Name of the disease from which the animal or animals are suffering, —.

Prominent symptoms present, —.

History of infection, —.

What action has the local board taken, —.

—

[Minnesota State Board of Health—Infectious diseases of animals.]

#### ORDER OF QUARANTINE FOR CATTLE SUSPECTED OF BEING TUBERCULOUS.

[Return promptly to the Veterinary Department of the Minnesota State Board of Health.]

City or town of —, —, 190—.

Description of cattle, —.

Date of test, —.

When quarantined, —.

Where quarantined, —.

Order of quarantine delivered to —.

Cattle owned by —.

Cattle in charge of —.

Notice delivered or posted (date and hour), —.

Remarks, —.

## ORDER OF QUARANTINE FOR CATTLE SUSPECTED OF BEING TUBERCULOUS.

[Original—(To be delivered to person or owner in charge).]

City or town of ———, ———; 190—.

To ——— (owner or person in charge):

You are hereby ordered to isolate under quarantine, upon your premises, the following-described cattle, ———.

These cattle are suspected of having tuberculosis, an infectious disease under the law. You are forbidden to violate, in any respect, the conditions of quarantine (see other side of this order).

You are warned of the danger of using any food product from these animals, and are forbidden to sell or otherwise dispose of any such product during quarantine.

[On back of order.]

## MINNESOTA STATE BOARD OF HEALTH.

The following rules were adopted by the Minnesota State Board of Health April 12, 1898, and apply to animals hereby quarantined:

All cattle which show symptoms of tuberculosis must be quarantined at once and the entire herd tested with tuberculin.

The owner shall be given the option of having his cattle which have reacted killed under inspection or continued under quarantine for a period not exceeding three months.

All cattle which give reactions on second test must be killed within one month after date of second test, and the stable must be cleaned and disinfected thoroughly before quarantine may be released.

Cattle that have reacted under tuberculin test may be taken out of quarantine for slaughter or other purposes only after due notice to the local health officer and upon written permission from the State Board of Health, and may be killed only in the presence of an authorized inspector of the local or State Board of Health.

The State Board of Health will furnish the necessary tuberculin for this work, but only to local health officers or upon written request from local health officers.

*Violation of quarantine defined.*

It shall be deemed a violation of quarantine for any person to knowingly remove, authorize, or cause to be removed, without written permission from the State Board of Health, any animal quarantined on account of tuberculosis, from the building, place, or inclosure wherein it was quarantined.

It shall be deemed a violation of quarantine for any person to knowingly place, cause, or authorize to be placed, without written permission from the State Board of Health, any animal or animals subject to tuberculosis, in the building, place, or inclosure where animals are quarantined on account of said disease.

It shall also be deemed a violation of quarantine for any person to knowingly dispose of, authorize, or cause to be disposed of, any butter, meat, milk, or other product, from cattle in quarantine.

AN ACT to prevent the spread of contagious and infectious diseases of domestic animals in this State. (Act of 1897.)

SECTION 9. Any person violating any provision of this act or any rule or regulation made by the State Board of Health, or by any local board of health or any order made by any such board under the authority thereof, shall be guilty of a misdemeanor, and be punished by a fine of not less than twenty-five (25) or more than one hundred (100) dollars, or by imprisonment for not less than thirty (30) or more than ninety (90) days.

[Infectious disease of animals—Minnesota State Board of Health—Office record No. —.]

BLANK FOR RECORDING TEST WITH TUBERCULIN.

[Use one of these blanks for each animal tested. Fill out carefully all details asked for in these blanks. Follow instructions on back for use of tuberculin.]

Township, —; county, —.

Name and post-office address of chairman of local board of health, —.

Owner's name and address, —.

Name and number of animal tested, —.

Description of animal: Age, —; sex, —; color, —; condition, —; weight, —; breed, —; markings, —.

History of infection, —.

Symptoms, —.

Date of injection, —, hour 10 p. m.; dose, — c. c.

*Temperatures.*

DAY OF INJECTION.

Date, —.

8 a. m., —.

10 a. m., —.

2 p. m., —.

6 p. m., —.

8 p. m., —.

DAY AFTER INJECTION.

Date, —.

6 a. m., —.

8 a. m., —.

10 a. m., —.

12 m., —.

2 p. m., —.

4 p. m., —.

6 p. m., —.

8 p. m., —.

10 p. m., —.

Watered at — each day.

Stable temperatures (hot, cool, or pleasant): Day of injection, —: day after injection, —.

Diagnosis (non-tuberculous, suspicious, or tuberculous), —.

Postmortem record or remarks, —.

Action taken by local board, —.

(Signature of veterinarian who made test) — —,

(Address) —.

MISSISSIPPI.

Mississippi has no law relating in any manner to bovine tuberculosis.

MISSOURI.

The situation with reference to bovine tuberculosis in Missouri is best stated in the language of Mr. J. R. Rippey, Secretary of the State Board of Agriculture, which is as follows: "We have no statute in this State especially applicable to tuberculosis. Section 10551 of the Revised Statutes of 1899 authorizes the Board of Agriculture to formulate regulations governing the movement into this State of affected animals. Under this provision the Board formulated regulations, which were promulgated by the Governor the 18th day of June last. These regulations, however, were clearly defective, and they were probably illegal from the fact that they discriminated against breeding cattle, while all other kind of cattle were admitted without hindrance; and they were ineffective from the fact that all a shipper

had to do from any locality quarantined against was to claim that his cattle were dairy cattle or stock cattle and not intended for breeding purposes, and no tuberculin test was required. By reason of these defects the proclamation was suspended by a recent action of the board and tuberculosis quarantine awaits future action."

### MONTANA.

No special law relative to bovine tuberculosis is on the statutes of Montana, but this disease is dealt with under the general law concerning contagious and infectious diseases of domestic animals.

Under this general law the Governor appoints a State Veterinary Surgeon, whose duties are "to investigate all cases of contagious and infectious diseases among cattle, horses, mules, and asses in this State" which may be brought to his knowledge; to inspect animals so diseased which may be brought into the State from other States or Territories against which the Governor has proclaimed a quarantine.

In all cases of contagious or infectious diseases the State Veterinary Surgeon may quarantine the premises. If the disease becomes epidemic, he must notify the Governor, who issues a proclamation forbidding the removal of any animal of the kind diseased from the quarantine district without a certificate from the State Veterinary Surgeon.

The State Veterinary Surgeon may, under certain restrictions, order the slaughter of animals so diseased, or which have been exposed to such diseases. Before animals are slaughtered they are appraised by three stock raisers, and a certificate of the valuation given to the owner, who is entitled to receive the full value of the appraisement. The indemnity is limited to animals destroyed because of the existence of some epizootic disease, and must not be paid in the following cases: Animals belonging to the United States; animals brought into the State contrary to law, or found to be diseased or having been exposed to disease before coming into the State; animals affected with any other incurable disease than the one for which slaughtered; animals which the owner knew to be diseased when he purchased them; or for animals which have come into the State within ninety days before slaughter. The board of county commissioners of each county must provide for a "stock-indemnity fund" by the levying annually a tax not to exceed one-half mill, the same to be paid out by the State Treasurer in accordance with the provisions of the law.

When the Governor has reason to believe that a contagious or infectious disease exists in another State or Territory he must issue a proclamation designating the locality and prohibiting the importation therefrom of animals of the kind diseased, except under such restrictions as may be made by him by the advice of the State Veterinary Surgeon.



## LAW.

SEC. 3000. The Governor is authorized to nominate and, by and with the advice and consent of the Senate, appoint a competent Veterinary Surgeon, who is known as the "State Veterinary Surgeon," who holds his office for two years, and must execute a bond in the sum of \$5,000, and who, before entering on his duties, must take and subscribe the oath of office prescribed by the constitution.

SEC. 3001. The duties of the State Veterinary Surgeon are:

1. To investigate all cases of contagious and infectious diseases among cattle, horses, mules, and asses in this State, of which he may have a knowledge, or which may be brought to his notice by any resident in the locality where such disease exists; and, in the absence of specific information, to make visits of inspection to any locality where he may have reason to suspect that there is any contagious or infectious diseases.

2. To inspect, under the regulations of this article, all such animals, which may be brought into this State, in any manner whatever, from or through such State, Territory, or foreign country, as the Governor may declare by proclamation, upon the recommendation of the board of stock commissioners, or otherwise, must be held in quarantine for the purpose of inspection for contagious or infectious diseases.

SEC. 3002. After the making of such proclamation the owner, or person in charge, of any such animals, arriving in this State, from or through any State, Territory, or foreign country, against which quarantine has been declared, must notify the State Veterinary Surgeon without delay, and must not allow such animals to leave the place of arrival until they have been examined by the Veterinary Surgeon and his certificate obtained that all such animals are free from disease; and no animal pronounced unsound from disease by the Veterinary Surgeon must be turned loose, allowed to run at large or removed or permitted to escape, but must be held subject to the order of the Veterinary Surgeon. Any person failing to comply with the provisions of this section is punishable as provided in Section 1174, of the Penal Code, and is liable for any damage and loss that may be sustained by any person by reason of the failure of such owner to comply with the provisions of this section.

SEC. 3003. The owner of such animals, ridden under the saddle or driven in harness into this State, or under yoke, and any person coming into this State with his own team or teams, is not required to notify the Veterinary Surgeon, or await the inspection of the animals, but he is liable for all loss or damage to any person by reason of any contagious or infectious disease brought into the State by his animals; and no such animals must be held in quarantine for a longer period than ninety days, unless contagious or infectious disease is found to exist among them.

SEC. 3004. In all cases of contagious or infectious disease among domestic animals or Texas cattle in this State, the Veterinary Surgeon has authority to order the quarantine of the infected premises, and in case such a disease becomes epidemic in any locality in this State, the Veterinary Surgeon must immediately notify the Governor, who must thereupon issue his proclamation forbidding any animal of the kind among which such epidemic exists to be transferred from said locality without a certificate from the Veterinary Surgeon showing such animal to be healthy. The expense of holding, feeding, and taking care of all animals quarantined under the provisions of this article must be paid by the owner, agent, or person in charge of such animals.

SEC. 3005. In case of any epidemic disease where premises have been previously quarantined by the Veterinary Surgeon, as before provided, he is further authorized and empowered, when in his judgment necessary, to order the slaughter of any and all such diseased animals upon said premises, and all such animals as have been exposed to contagion or infection, under the following restrictions: The order

must be a written one, and must be made in duplicate, and there must be a separate order and duplicate for each owner of the animals condemned, the original of each order to be filed by the Veterinary Surgeon with the Secretary of State and the duplicate given to the owner. Before slaughtering any animal that has been exposed only, and does not show disease, the Veterinary Surgeon must call in consultation with him two practicing veterinary surgeons or physicians, residents of the State, or, if this is impossible, then two stock owners, residents of the State, and he must have written indorsements upon his order of at least one of the consulting persons, stating that such action is necessary, before the animal is slaughtered.

SEC. 3006. Whenever, as in this article provided, the Veterinary Surgeon orders the slaughter of one or more animals, he must at the time of making such order notify in writing the nearest available justice of the peace, who must thereupon summon three disinterested citizens, who are stock owners in the neighborhood, to act as appraisers of the value of the animal. The appraisers, before entering upon the discharge of their duties, must be sworn to make a true and faithful appraisal without prejudice or favor. They must, after making their appraisal, return certified copies of their valuation, a separate one being made for each owner, together with an accurate description of each animal slaughtered (giving all brands, earmarks, wattles, age, sex, and class, as to whether American, half-breed, or Texas) to the justice of the peace by whom they were summoned, who must, after entering the same upon his record and making an indorsement upon each showing it to have been properly recorded, return it, together with a duplicate order of the Veterinary Surgeon, to the person owning the animal slaughtered; and it is the duty of the Veterinary Surgeon to superintend the slaughter of such animals as may be condemned, and also the destruction of the carcass, which latter must be by burning to ashes or burying in the earth to the depth of not less than 6 feet, and which must include every part of the animal and hide, and also excrement as far as possible. If the owner of any animal found diseased by the Veterinary Surgeon is killed, or consents to its being killed by the Veterinary Surgeon without appraisal, then the Veterinary Surgeon must burn or bury it as herein provided.

SEC. 3007. The Veterinary Surgeon must make an annual report on or before the first day of October to the State Board of Stock Commissioners of all matters connected with his work, and the board must make the same a part of their annual report to the Governor, and they must also transmit to the several boards of county commissioners such parts of the report as they consider necessary and of general interest to the breeders of live stock. The board must also give information in writing, as soon as it is obtained, to the Governor and to the various boards of county commissioners, of each case, or supposed case, of disease in each locality, the cause, if known, and the measures adopted to check it.

SEC. 3008. Whenever the Governor has good reason to believe that any disease mentioned in this article has become epidemic in certain localities in another State or Territory, or that conditions exist that render domestic animals and Texas cattle likely to convey disease, he must, by proclamation, designate such localities, and prohibit the importation therefrom of any live stock of the kind diseased into this State, except under such restrictions as he, after consultation with the Veterinary Surgeon, may deem proper. Any person who, after the publication of such proclamation, knowingly receives in charge any animal from any of the prohibited districts, and transports or conveys the same within the limits of this State, is punishable as provided in Section 1175 of the Penal Code, and is further liable for any and all damages and loss that may be sustained by any person by reason of the importation or transportation of such prohibited animals.

SEC. 3009. It is the duty of any person who has upon his premises, or upon the

public domain, any case of contagious or infectious disease among such animals, to immediately report the same to the Veterinary Surgeon; and a failure to do so, or any attempt to conceal the existence of such disease, or to wilfully or maliciously obstruct or resist the Veterinary Surgeon in the discharge of his duties, is punishable as prescribed in Section 1176, of the Penal Code, and forfeits all claims to indemnity for loss from the State.

SEC. 3010. The following regulations must be observed in all cases of disease mentioned in this article:

1. It is unlawful to sell, give away, or in any manner part with, any animal affected with, or suspected of being affected with, contagious or infectious disease; and in case of any animal that may be known to have been affected with or exposed to any such disease, within one year prior to such disposal, due notice of the fact must be given in writing to the party receiving the animal.

2. It is unlawful to kill for the purpose of selling the meat, any such animal, or to sell, give away, or use any part of it or its milk, or to remove any part of the skin. A failure to observe these provisions is punishable as provided in Section 1176 of the Penal Code. It is the duty of the owner or the person having in charge any such animal affected with, or suspected of being affected, any contagious or infectious disease, to immediately confine the same in a safe place, isolated from other animals, and with all necessary restrictions to prevent dissemination of the disease, until the arrival of the Veterinary Surgeon. These regulations apply as well to animals in transit through the State as to those resident therein; and the Veterinary Surgeon, or his duly authorized agent, has authority to examine, in car, yard, pastures, or stables, or upon the public domain, all such animals, and on detection of disease, to take possession of, and treat and dispose of the animals in the same manner as provided by this article.

SEC. 3011. All claims arising from the slaughter of animals under the provisions of this article, together with the order of the Veterinary Surgeon and the valuation of the appraisers in each case, must be submitted to the State Auditor, and for each claim that he finds to be equitable and entitled to indemnity under this article must issue to the person entitled thereto his warrant on the stock indemnity fund in the State Treasury for the sum named in the appraiser's report. In auditing any claim under this article the auditor must satisfy himself that it does not come under any class for which indemnity is prohibited by this article, and he must require the affidavit of the claimant to this fact, or if the claimant be not cognizant thereof, then of some reputable person who is cognizant thereof; and also the certificate of the Veterinary Surgeon, whose duty it is to inform himself fully of the fact, that in his opinion the claim is legal and just, and the auditor may, in his discretion, require further proof.

SEC. 3012. The indemnity granted is the value of the animal as determined by the appraiser with reference to its diminished value because of being diseased or having been exposed to disease. The indemnity must be paid to the owner upon his application and the presentation of the proofs prescribed therein, and such application must be made within six months after the slaughtering of the animal or the claim is barred. The right to indemnity under this article is limited to animals destroyed by reason of the existence of some epizootic disease generally fatal and incurable, such as rinderpest, hoof-and-mouth disease, pleuropneumonia, anthrax, or Texas fever, among bovines, and glanders among horses, mules, and asses. For the ordinary contagious diseases, not in their nature fatal, such as epizootic and influenza in horses, no indemnity must be paid. The right to indemnity does not exist, and the payment of such must not be made, in the following cases:

1. For animals belonging to the United States.
2. For animals that are brought into the State contrary to the provisions of this article.



3. For animals that are found to be diseased, or that are destroyed because they have been exposed to disease before or at the time of their arrival in the State.

4. When an animal was previously affected by any other disease, which, from its nature and development, was incurable and necessarily fatal.

5. When an owner or person in charge has knowingly or negligently omitted to comply with the provisions of Sections 3009 and 3010 of this article.

6. When an owner or claimant, at the time of coming into possession of the animal knew it to be diseased, or received the notice specified in the first clause of Section 3010 of this article.

7. When the animal has been brought into the State within ninety days immediately preceding the outbreak of disease, on account of which such animal was killed.

SEC. 3013. The Veterinary Surgeon receives for his services an annual salary of \$2,500. No person must receive the appointment of State Veterinary Surgeon who is not a graduate in good standing of a recognized college of veterinary surgeons, either in the United States, Canada, or Europe.

SEC. 3014. The appraisers mentioned in this article receive \$3 for each day or part of a day they are actually employed, which must be paid from the State Treasury out of the stock indemnity fund in this article provided, upon vouchers which bear the certificate of the justice who summoned them. The justice receives his ordinary fee for issuing a summons, to be paid out of the stock indemnity fund. The persons called in consultation by the Veterinary Surgeon each receives \$3 for each day or part of a day they are actually employed, and 10 cents per mile for distances actually traveled. which sums must be paid from the State Treasury out of the stock indemnity fund upon vouchers certified to by the Veterinary Surgeon. The incidental expenses in causing animals to be slaughtered and their carcasses to be burned, and disinfecting infected premises, must be paid from the State Treasury out of the stock indemnity fund, upon vouchers.

SEC. 3015. The liability for indemnity for animals destroyed and for fees, costs, and expenses incurred under the provisions of this article in any year is limited by, and must in no case exceed, the amount especially designated for the purpose and for that period, by the terms of that article; nor must the Veterinary Surgeon or anyone else incur any liability under the provisions of this article in excess of the surplus in the stock indemnity fund hereinafter provided; nor must any act be performed or property taken under the provisions of this article become a charge against the State.

SEC. 3016. The board of county commissioners of each county must, at the time of making the annual assessment, levy a special tax not exceeding one-half of one mill on the dollar upon the assessed value of all cattle, horses, mules, and asses in the county, to be known as the "Stock Indemnity fund;" said tax must be collected and paid to the State Treasurer in the manner provided by law for the levying, collection, and payment of other State taxes, which fund constitutes the indemnity fund specified by this article to be used in paying for animals destroyed and for fees, costs, and expenses provided under the provisions therefor. It must be used exclusively for that purpose, and must be paid out by the State Treasurer as provided in this article.

SEC. 3017. The Veterinary Surgeon must select the place where stock must be quarantined.

SEC. 3018. The Veterinary Surgeon has power to appoint, from time to time, deputies, not exceeding four in number, at any time he can not personally attend to all the duties required by his office, at a salary not to exceed \$5 per day for each day actually employed, to be paid out of the stock-indemnity fund, and must designate the county for which each deputy is to act.



## QUARANTINE PROCLAMATION.

STATE OF MONTANA, EXECUTIVE OFFICE,

*Helena, March 13, 1897.*

Whereas under the provisions of an act of the Legislative Assembly of the State of Montana entitled, "An act to provide for the appointment of State Veterinary Surgeon, and to suppress and prevent infectious diseases among domestic animals," it is made my duty, whenever I shall have good reason to believe that any disease covered by this act has become epizootic in certain localities in any other State or Territory or foreign countries, or that conditions exist that render domestic animals liable to convey disease, that I shall thereupon, by proclamation, schedule such localities and prohibit the importation from them of any bulls, cows, or calves for breeding purposes into this State, except under such restrictions as I, after consultation with the Veterinary Surgeon, may deem proper; and

Whereas I have reason to believe that conditions exist that render cattle in any and all of the other States, Territories, and foreign countries, if brought into this State, liable to bring with them the disease known as tuberculosis, or consumption:

Now, therefore, I, Robert B. Smith, Governor of the State of Montana, in obedience to the duty imposed upon me by said statute and the terms thereof, do hereby schedule the localities hereinbefore named, and I do hereby forbid the importation into the State of Montana of any bulls, cows, or calves whatsoever for breeding purposes which have been brought from any portion of said scheduled localities, except upon the following conditions:

All bulls, cows, or calves intended for breeding purposes shall have a certificate of health, stating that tuberculin has been used in said examination, accompanied by a copy of the record kept during the tuberculin test, and that said examination has been made by an official veterinarian of some State, Territory, or foreign country, and that said bull, cow, or calf is free from tuberculosis, or consumption.

Should such examination be impossible for any reason before such animals come into this State, then shall such animal or animals remain in quarantine until the State Veterinarian or his deputy can make such examination, at the owner's expense, and give such certificate for each animal, using the tuberculin test in each examination and on each bull, cow, or calf so imported for such breeding purposes.

All cattle imported from the aforesaid scheduled localities shall be subject to quarantine for ninety days, or for such shorter time as may be deemed necessary in the opinion of the State Veterinary Surgeon or his duly authorized deputy, to determine whether such cattle have been exposed to the infection of tuberculosis, or consumption, prior to importation.

And I do hereby warn all corporations, persons, or companies to give due and full notice to the State Veterinary Surgeon of Montana, preceding the arrival at the boundary line of the said State of Montana, of all such cattle as come within the provisions of this proclamation.

*Provided, however,* That nothing in this proclamation shall be so construed as to prohibit the transportation of any cattle through or into this State, providing a certificate of health from any State, Territorial, or Government Veterinarian shall accompany them, stating that the State or locality from which such cattle came is free from tuberculosis.

In witness whereof I have hereunto set my hand and caused the great seal of the State of Montana to be affixed at the City of Helena, the capital of said State, this 13th day of March, A. D. 1897.

By the Governor:

ROBERT B. SMITH.

Attest:

T. S. HOGAN, *Secretary of State.*

## NEBRASKA.

There is no special law relative to bovine tuberculosis in Nebraska, but sections given below, from the Compiled Laws (1897), are applicable to that disease.

It is unlawful to drive cattle affected with any contagious or infectious disease through the State or to import into the State animals so affected. Animals so diseased shall not run at large, nor shall anyone sell such animals, knowing them to be diseased, without disclosing their condition to the purchaser.

## LAWS.

453. SEC. 10. That every person shall so restrain his diseased or distempered cattle, or such as are under his care, that they may not go at large; and no person or persons shall drive any diseased or distempered cattle affected with any contagious or infectious disease into or through this State or from one point thereof to another. Any person or persons offending against this section shall, on conviction thereof before any justice of the peace, forfeit not less than \$5 nor more than \$25 for every head of such cattle, and be liable for all costs and damages.

454. SEC. 11. Any justice of the peace, upon proof before him that any cattle are going at large or are driven in or through his county in violation of the preceding section, shall order a constable or sheriff to impound them, and the owner thereof shall be held liable for all costs and damages.

479. SEC. 36. It shall not be lawful for the owner of any domestic animal or animals, or any person having them in charge, knowingly to import or drive into this State any animal or animals having any contagious or infectious disease; and any person so offending shall be deemed guilty of a misdemeanor, and shall be punished by fine in any sum not less than \$1 nor more than \$100, and be imprisoned in the county jail not more than three months, or both, in the discretion of the court.

480. SEC. 37. Any person being the owner of any domestic animal or animals, or having the same in charge, who shall turn out, or suffer any such domestic animal or animals having any contagious or infectious disease, knowing the same to be so diseased, to run at large upon any uninclosed land, common, or highway, or shall let the same approach within twenty rods of any highway, or shall sell or dispose of any domestic animal or animals, knowing the same to be so diseased, without fully disclosing the fact to the purchaser, shall be deemed guilty of a misdemeanor and shall be punished by a fine in any sum not exceeding \$500 and imprisoned in the county jail not less than six months.

481. SEC. 38. Nothing in this act shall be so construed as to prevent the recovery of damages in a civil action against any person or persons who shall sell, trade, or import, or drive into this State such diseased animal or animals, or who shall allow such domestic animal or animals to run at large, or to approach nearer than twenty rods of any highway.

482. SEC. 39. Any person violating any of the provisions of this act, in addition to the penalties herein provided, shall be liable for all damages that may accrue to the party damaged by reason of said diseased animal or animals imparting disease.

AN ACT to amend Section 76 of the Criminal Code of the State of Nebraska, and to repeal said Section 76 as it now exists. (Approved March 30, 1899.)

*Be it enacted by the Legislature of the State of Nebraska:*

SECTION 1. That Section 76 of the Criminal Code of the State of Nebraska be amended so as to read as follows:

“SEC. 76. It shall be unlawful for any person to sell, barter, or dispose of, or permit to run at large any horses, cattle, sheep, or domestic animal, knowing that such

horse, cattle, sheep, or domestic animals are infected with contagious or infectious disease, or have been recently exposed thereto, unless he shall first duly inform the person to whom he may sell, barter, or dispose of such horse, cattle, sheep, or other domestic animal, of the same; and any person so offending shall be fined in any sum not less than \$20 nor more than \$100, or be confined in the jail of the county not exceeding three months."

SEC. 2. That Section 76 of the Criminal Code of the State of Nebraska as heretofore existing, be and the same hereby is repealed.

### NEVADA.

The law concerning tuberculosis in Nevada is included in the general law against contagious diseases; tuberculosis, however, is specifically mentioned.

The law provides for a State Live Stock Inspector to be appointed by the Governor and under the control of the State Board of Health. If upon examination the inspector finds animals infected with a contagious or infectious disease and deems it proper that they should be quarantined, he shall notify the district court of the character of the disease and the number of animals infected. Said court shall appoint five freeholders to make examination and, if a majority of them agree with the inspector, they shall certify the same to the said court, who shall command the sheriff to compel the owner to quarantine such stock and to close all creameries and dairies in the district so affected until the disease abates, and no stock shall be removed from the infected district without the inspector's certificate of health accompanying them.

No stock which have not been inspected and which are not accompanied by a certificate of health from the inspector shall be allowed to enter the State.

The inspector is required to make in detail monthly reports of his work.

An act approved March 10, 1891, provides that no cattle shall be brought into the State which have had any contagious or infectious disease within ninety days immediately prior to their importation.

### LAWS.

AN ACT providing for the appointment of a State Live Stock Inspector, defining his duties, and fixing his compensation. (Became a law March 22, 1899.)

SEC. 5. It shall be the duty of the justice of the peace, district attorney, or board of county commissioners to notify said State Live Stock Inspector at once at his office by letter or telegram. It shall be his duty to go to the locality named and give such aid and instructions as he may think best for the prevention or cure of the diseases with which he shall find such live stock infected with.

SEC. 6. If upon investigation said State Live Stock Inspector shall be satisfied that said live stock is infected with what is known as pleuropneumonia, tuberculosis, anthrax, glanders, or any other contagious and infectious disease against which he may think best to quarantine, he shall immediately notify the district court of the judicial district or one of the judges thereof in vacation in said county in which said diseased stock may be found, setting forth in writing the number of stock infected, the character and type of the disease. Said court or judge



thereof in vacation shall thereupon issue an order in writing commanding the sheriff to immediately summon five freeholders, being stock raisers, who shall proceed at once to the locality where such diseased stock may be and carefully examine the same with the inspector. If a majority of said freeholders shall find such stock infected as aforesaid, they shall certify such finding in writing to the court or judge aforesaid, who shall thereupon issue an order in writing commanding the sheriff to compel the owners or other persons in whose possession such diseased stock shall be found to immediately quarantine such diseased stock and to close all creameries or dairies in the affected district until such time as the disease abates, and that no stock shall be moved from the infected district until they have been examined and the inspector's certificate of health accompanying them, and that all stock dying from contagious or infectious diseases that their carcasses shall be burned immediately and not buried or left to decay.

SEC. 7. No stock from affected districts in other States or Territories will be allowed to cross the lines and enter Nevada until they have first been inspected at the owner's expense. The inspector's fee shall be \$10 per day and necessary traveling expenses. This shall be applied to the general fund of the State of Nevada. The inspector may be notified by letter or telegram; he shall go at once to the place on the border line mentioned and inspect said stock; if found healthy, give a certificate of health to those in charge of said stock on the payment of inspector's fees and necessary traveling expenses.

SEC. 8. Any person or persons, company, or corporation who shall violate any provision of this act shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be fined in any sum not to exceed \$500 nor less than \$50, or by imprisonment in the county jail not more than six months nor less than fifty days for each offense.

SEC. 9. The sheriff shall receive for his services under this act such compensation as is now provided by law for similar labor, and the freeholders making such examinations as aforesaid shall receive such compensation as is now provided by law for juror's services, which shall be allowed by the district court of the district and paid out of the county treasury of the county in which such diseased stock shall be found, as other claims are paid.

SEC. 10. Said inspector shall report to the board of health in writing at least once in every month, setting forth the locality or localities visited as provided in the preceding section, the kind of stock inspected, the time taken to inspect them, the number admitted to cross the line into Nevada, the number permitted to leave infected districts, and to whom certificates of health for stock were given and the amount of fee received for inspecting and issuing certificates; also the kind of stock treated, the type and character of the disease, the remedies prescribed, and the results as far as known. He shall also render an account for the number of miles traveled and the actual sum of money paid out by him therefor; and if found correct, shall be audited and allowed by the board as is now provided by law.

SEC. 11. The secretary of the aforesaid board shall from time to time select from said report and publish such information as he may think valuable to the people of Nevada. This information may be published in connection with the report relating to agriculture or in a separate bulletin.

SEC. 12. The State Live Stock Inspector herein provided for shall receive a salary not to exceed \$1,200 per annum and necessary traveling expenses, payable out of the general fund of the State of Nevada as other claims are paid.

SEC. 13. The State Controller is hereby authorized, empowered, and required to draw his warrant in favor of the State Live Stock Inspector created by this act for the salary and traveling expenses provided for in this act when approved by the board of examiners, and the State Treasurer is hereby authorized, empowered, and directed to pay the same.

SEC. 14. It shall be the duty of the secretary of said board of health to collect



the information derived from the report made by said inspector as provided for in this act and make a report to the State Legislature within ten days of the date of the meeting thereof, such data and useful knowledge, together with suggestions, as may be beneficial to the stock interests of the State of Nevada.

### NEW HAMPSHIRE.

The State Board of Cattle Commissioners of New Hampshire deals with tuberculosis under a general law against contagious and infectious diseases of domestic animals.

This law authorizes the Governor to cooperate with the United States Bureau of Animal Industry in measures for the suppression and extirpation of such diseases.

The work against these diseases is in the hands of a State Board of Cattle Commissioners, whose duty it is to make investigations in regard to contagious and infectious diseases among domestic animals and to make such regulations as they may deem necessary to exclude or arrest the same.

Selectmen are required to quarantine animals so diseased so long as it may be necessary in order to prevent the spread of disease, and in so doing are to be governed by the rules and regulations of the State Board of Cattle Commissioners. The selectmen or the board may order the killing of any animal if, in the opinion of a veterinarian selected by them, it is affected with a contagious or infectious disease. Animals so killed shall be appraised, and the owner may receive from the town their full value in their diseased condition, if the animals have been owned within the State for a period of three months before the detection of the disease. If an owner is not satisfied with the appraisal, he may appeal to the Supreme Court within thirty days.

All costs in connection with this work are paid by the towns, but four-fifths of the amount are reimbursed by the State.

An amendment to the law in 1893 makes an exception to the general law as abstracted above. It provides that the owner of cattle killed by order of the State Board of Cattle Commissioners shall recover from the State one-half the value of such animals upon a basis of health.

The work with reference to tuberculosis under these laws is fully set forth in the report of the Board of Cattle Commissioners in the Report of the Board of Agriculture for the biennial period ended October 1, 1898, which is copied herewith:

#### REPORT OF THE STATE BOARD OF CATTLE COMMISSIONERS.

[CHAPTER 113, PUBLIC STATUTES.]

SECTION 1. The Governor is authorized to accept on behalf of the State the rules and regulations prepared by the Commissioner of Agriculture under and in pursuance of Section 3 of an act of Congress approved May 29, 1884, entitled "An act for the establishment of a bureau of animal industry, to prevent the exportation of diseased cattle, and to provide means for the suppression and extirpation of

pleuropneumonia and other contagious diseases among domestic animals," and to cooperate with the authorities of the United States in the enforcement of the provisions of such act.

SEC. 2. The inspectors of the Bureau of Animal Industry of the United States shall have the right of inspection, quarantine, and condemnation of animals affected with any contagious, infectious, or communicable disease, or suspected of being so affected, or that have been exposed to any such disease; and for these purposes are authorized and empowered to enter upon any ground or premises. They shall have power to call on sheriffs, constables, and peace officers to assist them in the discharge of their duties in carrying out the provisions of said act of Congress; and it is made the duty of said officers to assist them when so requested. The inspectors shall have the same powers and protection as peace officers while engaged in the discharge of their duties.

SEC. 3. All damages and expenses incurred under the preceding sections shall be paid by the United States, and in no case shall this State be liable for any part thereof.

SEC. 4. The Secretary of the State Board of Agriculture, the Master of the New Hampshire State Grange of Patrons of Husbandry, and the Secretary of the State Board of Health, for the time being, shall constitute a board to be known as the State Board of Cattle Commissioners. If a vacancy in the board shall occur, the Governor, with the advice of the council, shall fill it by appointment, and the appointee shall hold office until the vacancy in the office occasioning the vacancy in the board is filled.

SEC. 5. The board shall make investigations in regard to the existence of contagious and infectious diseases among domestic animals in the State, and may make regulations prohibiting the introduction into the State of animals so diseased, and controlling or prohibiting their transportation, and such other regulations as the board deems necessary to exclude or arrest any such disease, and may modify or amend its regulations as the circumstances shall require.

SEC. 6. The board may employ skilled veterinarians and agents and servants to aid in the performance of the duties assigned to the board.

SEC. 7. Any person or corporation who shall violate any of the regulations of the board shall be fined not exceeding \$100.

SEC. 8. The compensation and expenses of the board shall be audited and fixed by the Governor and council, and shall be paid from the State Treasury; but all expenses incurred under the provisions of this chapter shall not exceed \$10,000 in any one year.

SEC. 9. Selectmen shall cause all horses infected with glanders or other contagious disease, and all other domestic animals infected with contagious diseases, or which have been exposed to such diseases, to be collected in some suitable place or places and kept isolated from other animals so long as may be necessary to prevent the spread of the diseases.

SEC. 10. In the performance of the duties prescribed by the preceding section, the selectmen shall be governed by the regulations and directions that may be made or given on the subject by the State Board of Cattle Commissioners.

SEC. 11. The State Board of Cattle Commissioners, or, if they have not taken cognizance of the case, the selectmen of the town in which the animal is, may order any domestic animal to be killed and buried which, in the opinion of a veterinary surgeon selected by them, has a contagious or infectious disease.

SEC. 12. The owners of animals so killed shall be entitled to recover of the town the value of such animals in their diseased condition if they had been owned in the State three months at least before the disease was detected. The State Board of Cattle Commissioners, or the selectmen, as the case may be, shall cause the value to be ascertained by the appraisal of three competent and disinterested persons selected by them, who shall be sworn to the faithful discharge of their duties.

SEC. 13. In case the owner is aggrieved by the appraisal, he may appeal by petition to the Supreme Court within thirty days after he is notified of the appraisal. He shall notify the town of his appeal, and enter and prosecute it as he would if it were a civil action at law wherein the same amount of damages was claimed, and judgment shall be rendered therein in like manner.

SEC. 14. If upon such appeal he recovers a larger sum than the appraisers awarded him, he shall recover his taxable costs; otherwise he shall pay costs.

SEC. 15. All damages and expenses incurred under the six preceding sections, except expenses incurred by the State Board of Cattle Commissioners, shall be paid by the town in the first instance; but four-fifths thereof shall be reimbursed to it from the State Treasury. The Governor and council shall audit all claims thus presented, and the Governor shall draw his warrants upon the Treasurer for the amounts allowed in favor of the towns entitled thereto.

SEC. 16. In cases where United States inspectors, State commissioners, and selectmen, or any two of such boards, take action with reference to the same subject-matter under the provisions of this chapter, they shall have precedence in authority in the order above named.

SEC. 17. Any person or corporation who shall bring into the State, between the twentieth day of May and the twentieth day of October, any Texas or Cherokee cattle that have not been kept north of the Ohio or Missouri river during the winter immediately preceding, shall be fined not exceeding \$25 for each animal so brought into the State. The term Texas or Cherokee cattle shall be construed to mean the native cattle of Texas and Louisiana and the classes of cattle known under those names.

SEC. 18. Any person who shall expose, or suffer to be exposed, in any highway, public place, or pasture, any horse affected by the disease known as glanders, shall be fined not exceeding \$50 for each offense, for the benefit of the town or city where the offense is committed.

SEC. 19. Any person exposing any domestic animal as aforesaid affected with any other contagious or troublesome disease shall be fined not exceeding \$25 for each offense, for the benefit of the town.

SEC. 20. It shall be the duty of selectmen and police officers of towns in which any of the offenses mentioned in the three preceding sections shall be committed to cause the offenders to be prosecuted.

At the session of the Legislature of 1893 the following amendment was passed:

SECTION 1. The owners of cattle killed by order of the State Board of Cattle Commissioners shall recover of the State one-half the value of such animals upon a basis of health, said value to be ascertained by a disinterested appraisal, provided they have been owned in the State three months at least before the disease was detected.

SEC. 2. All acts and parts of acts inconsistent with this act are hereby repealed, and this act shall take effect upon its passage. ♦

#### QUARANTINE REGULATIONS.

The following order is still in force:

STATE OF NEW HAMPSHIRE,  
BOARD OF CATTLE COMMISSIONERS,  
*Concord, July 14, 1896.*

#### *General Order No. 3.*

1. General Order dated January 11, 1892, and General Order dated January 19, 1892, are hereby repealed.

2. All persons and companies are hereby prohibited from bringing or driving neat cattle into the State of New Hampshire without a permit from this board.

3. All neat cattle brought or driven into the State of New Hampshire under a permit from this board are hereby placed in quarantine upon arrival in the State until identified and released.

4. Selectmen of towns and cities of New Hampshire are hereby authorized to seize and hold in quarantine any neat cattle coming into the State without a legal permit, and notify this board at once of such action.

5. Permits to bring or drive neat cattle into New Hampshire will be issued only upon the result of the tuberculin test, to be applied and reported under such regulations and forms as will be furnished upon application to this board.

6. This order is issued under authority of Chapter 113 of the Public Statutes of New Hampshire, and all violations will be vigorously prosecuted.

7. This order shall take effect on the fifteenth day of July, 1896.

IRVING A. WATSON, *President*;  
N. J. BACHELDER, *Secretary*,  
*Board of Cattle Commissioners.*

The following explanatory circular was issued in connection with the above order:

STATE OF NEW HAMPSHIRE,  
BOARD OF CATTLE COMMISSIONERS,  
*Concord, July 14, 1896.*

*To whom it may concern:*

The quarantine regulations issued by the Board of Cattle Commissioners of the State of New Hampshire against all cattle outside of the State are made necessary by the action already taken in the same line by the authorities of other New England States. Evidence has been submitted to this board that animals failing to pass the test, and therefore debarred from those States, are being brought into New Hampshire, and are contributing to our milk supply, to the injury of the healthfulness and reputation of New Hampshire dairy products.

Persons desiring to bring cattle into New Hampshire will be furnished, upon application, with the necessary blanks upon which to forward the result of the test, said test to be made by any person who is satisfactory to the cattle commissioners of the State in which the test is made. Upon arrival in this State the cattle will be identified and released as soon as practicable by this board or its representative.

In making the report of tuberculin test, when applying for a permit, both the original and duplicate reports are to be made out and forwarded to this office without being detached from the blank permit.

BOARD OF CATTLE COMMISSIONERS,  
*Concord, N. H.*

#### MODIFICATION OF QUARANTINE ORDER.

STATE OF NEW HAMPSHIRE,  
BOARD OF CATTLE COMMISSIONERS,  
*Concord, April 1, 1897.*

#### *General Order No. 4.*

General Order No. 3, dated July 14, 1896, is hereby modified as follows:

On and after this date, unless otherwise ordered, neat stock will be admitted to the State of New Hampshire for pasturage or for domestic use under the following conditions:

1. Applications for permit to bring cattle into New Hampshire for pasturage or for domestic use must be made upon blanks furnished by this board.



2. The owner or drover of said cattle must state upon said application that they are brought into the State for pasturage or for domestic use.

3. The owner or drover of said cattle must furnish upon said application the certificate of a veterinarian who is a regular graduate of a veterinary institution or who is recommended by the cattle commissioners of the State from which the cattle are sent, stating that the cattle have been subjected to a physical examination and no symptoms of tuberculosis or other contagious disease are found.

4. Applications from Massachusetts must also state that the cattle have been tagged by the Massachusetts Cattle Commission, which will entitle them to return to that State without reexamination, and must be indorsed in this respect by the Massachusetts Cattle Commission or agent of said commission.

5. This order will take effect April 1, 1897, and remain in force until revoked by this board.

N. J. BACHELDER,

*Secretary New Hampshire Board of Cattle Commissioners.*

The following explanatory circular was issued in connection with the modification order:

STATE OF NEW HAMPSHIRE,

BOARD OF CATTLE COMMISSIONERS,

*Concord, April 1, 1897.*

*To owners and drovers of stock:*

The inclosed order modifies the previously existing regulation in regard to bringing neat stock into New Hampshire for pasturage, inasmuch as it allows a physical examination instead of requiring the tuberculin test. The application for permit must be made to the board upon the application furnished by this board, and no neat cattle can be legally admitted for pasturage until said application has been properly filled out and filed with this board and the permit issued in due and regular form. In short, this order simply allows the report of the physical examination to be filed with this board instead of the report of the tuberculin test, and a permit to bring cattle into New Hampshire for pasturage or other purposes is just as necessary as before the issuing of this order.

Selectmen and other officials have full authority to proceed against violators of this and the previous order as modified, the same as before, and all parties will govern themselves accordingly.

N. J. BACHELDER,

*Secretary New Hampshire Board of Cattle Commissioners.*

While the law enacted to govern this matter confers upon the executive officer of the State Board of Health, the State Board of Agriculture, and State grange the authority in the suppression of contagious diseases among animals, yet all action taken and money expended have been with the approval of the several organizations named and by the advice of the Governor and council. While every case coming to the attention of the board has been investigated and such action taken as the policy of the board demanded, the keeping of the work within legitimate bounds has been somewhat complicated by the appropriation made by the Legislature in 1895 of \$100,000 for the prosecution of this work, vetoed by the Governor. The present commission has never held that the exigencies of the case required the expenditure of any such amount of money, and subsequent events have proven this position to be sound. The present commission has never sought or desired the management of this matter, and favored the above bill after it was so restricted as to be under the entire control of the Governor and council and provided for the appointment of a commission to control and direct the matter. We make this somewhat extended reference to the action leading up to the period for which this report is made in order that we may more intelligently report the work accomplished and state our conclusions deduced therefrom.

The members of the commission have been allowed by the Governor and council \$500 annually for clerk hire, which, with the exception of printing and postage, has been the entire office expense in the administration of the law. All applications to the board for permits to admit cattle to the State have been complied with if the proper certificate of soundness was furnished, and several thousand animals have been annually admitted under this regulation. All applications to the board for inspection of herds within the State have been given attention by forwarding to the parties making application a blank form of which the following is a copy:

## APPLICATION FOR CATTLE INSPECTION.

\_\_\_\_\_, 1898.

BOARD OF CATTLE COMMISSIONERS OF THE STATE OF NEW HAMPSHIRE,

Concord.

GENTLEMEN: I hereby make application for an official inspection of my herd of cattle, in regard to which I make the following statement:

My entire herd consists of \_\_\_\_\_ cattle.

First noticed symptoms of disease about \_\_\_\_\_.

Symptoms noticed are \_\_\_\_\_.

These cattle are at my stable, located about \_\_\_\_\_ miles from \_\_\_\_\_, the nearest railroad station.

If the board considers an investigation advisable, and upon a physical examination finds sufficient symptoms of tuberculosis in the herd to warrant, in the opinion of the board, the application of the tuberculin test to the herd, I hereby authorize its application by the board. I understand the expense of making an inspection to be entirely borne by the board, and that, according to law, I am to receive one-half the health value of all animals condemned by the test and destroyed in the presence of myself or that of my agent. I also agree to disinfect the stable and take other precautionary measures in accordance with the instructions of the cattle commissioners.

\_\_\_\_\_,  
(Address) \_\_\_\_\_.

This plan has been strictly adhered to except in an occasional case where arrangements had been previously made to inspect herds in the immediate vicinity of the person applying and there was not time to have the blank forwarded and returned. The inspection would then be made without the formal application, as it required no extra expense. Other exceptions have been in the case of applications from boards of health or in the suspected existence of glanders in horses, both of which have generally had prompt attention.

All applications for inspection in official form as indicated above have had careful consideration by the board, and if the conditions reported indicated the presence of any contagious disease an inspection was ordered as soon as practicable. It has not been the practice of the board to make a second inspection in a town immediately after a previous visit, but to make the inspection as soon as the circumstances seemed to warrant, using discretion in the matter. In this work the most distant sections of the State have had equal attention with the central, and no inspection has been withheld on account of any extra expense in reaching the herd.

In addition to the action taken by the commissioners in the above-named cases the selectmen have acted in specific cases located in six towns, under the direction of the commissioners. This action by the State, and by the selectmen directed by the State, has resulted in locating and destroying 234 tuberculous cattle and 18 glandered horses. A postmortem examination has been made of every animal destroyed, and in every instance the disease for which the animal was destroyed has been found, and to such extent as to satisfy the owner of its existence without

microscopic examination. In such inspections as seemed to need special attention, or where conditions were likely to exist that would need the personal attention of members of the commission, they have been present, and these cases have been growing less each year. The work of the commission has been systematized so that the greatest result could be obtained with the least possible expense.

The tuberculin test has been applied to some extent during the work of the commission, and, when first announced by supposed authorities as the proper agency for determining what animals should be killed and buried, was used for a short time as the main dependence in our work. During this trial with tuberculin 296 cattle were condemned and buried from the application of the test, and all were given a postmortem examination. A thorough observation of the results in this course, and a careful study of the matter as reported from various authorities, convinced the board that the doubt existing in its mind at the start in regard to the practicability of such a course was well founded, and the practice was abandoned except in special cases where its use seemed justifiable. About this time, when the policy of destroying cattle upon the result of the tuberculin test alone was more in doubt in the minds of the members of the board than later, Mr. F. B. Shedd, of Northfield, offered a fine herd of Holstein cattle for experimental purposes that failed to pass the tuberculin test. The offer was accepted, and under date of June 25, 1898, the following report was made upon the experiment:

CONCORD, *June 25, 1898.*

The attention of the cattle commissioners was called June 12, 1897, to a herd of thoroughbred Holstein cattle owned by Mr. F. B. Shedd, of Northfield, an extensive landowner, cultivating and improving one of the finest farms in New Hampshire. The tuberculin test had been applied by a veterinarian employed by Mr. Shedd to twenty-one cattle, twelve of which failed to pass, and in which the temperature reaction was very high. Two of the twelve were advanced cases of tuberculosis and had been destroyed before the arrival of the commissioners. The ten animals remaining, to which our attention was called, consisted of nine thoroughbred Holstein cows and a thoroughbred Holstein bull, the latter weighing over 2,000 pounds, all of which were under 4 years old. We found the nine cows isolated from all other cattle, and so much excitement prevailed that the inclosure in which they were kept was a source of serious alarm to many of the neighboring people. The bull had been assigned the entire barn, and the general appearance of all the cattle was vigorous and healthy.

We stated to Mr. Shedd that it was not our practice to destroy animals simply upon the result of the tuberculin test without other evidence of disease. To this position strong exception was taken by the owner of the cattle, who expressed a very decided opinion that the cattle should be destroyed. After a lengthy discussion of the matter Mr. Shedd offered to contribute the ten reacting animals free of cost for the purpose of an experiment to determine, as far as possible, the proper course to take with cattle in a similar condition. This generous proposition was accepted by the commissioners, with the understanding that at the end of one year a report of results should be made to the public, and, if advisable at that time, the remaining animals in the experiment should be killed and examined. Some idea of the generosity of the gentleman in contributing the cattle can be obtained from the fact that these ten animals were easily worth \$1,000 if sound, and, according to the law of appraisal for condemned animals, would have cost the State \$500 if destroyed. The ten animals were taken to Andover June 25, and, the year having expired, we make a report in accordance with the agreement.

The nine cows were placed upon an isolated farm where they were given such sanitary treatment for the promotion of health as any dairy cattle should have. This includes good ventilation, light, exercise, and moderate feed. The animals were kept in the open air both day and night, except in stormy weather, and for six months the milk of the entire herd was thrown away or fed to pigs. When these cattle were brought to the town some objections were raised on account of endangering other herds, so intense was the fear of tuberculosis, but, there being no objection on the part of the adjoining landowners, there was little attention given to this unnecessary scare. The bull, owing to his size and strength, was kept in another section of the town, where he could be properly handled. These animals were tested with tuberculin by a disinterested veterinarian September 12, December 9, February 23, and those not previously killed May 9. Five of the ten animals passed the test successfully September 12, and five, including the bull, failed



to pass. Owing to the inconvenience and expense of keeping the bull, and the supposition on the part of a few people that he was badly diseased, he was killed soon after the test in September, although there was no previous indication of disease from a careful physical examination. He was killed for the purpose of the experiment and carefully examined by a veterinarian in the presence of many people, but the examination failed to reveal any more evidence of disease than can be found in a large percentage of the cattle in the country to-day. It was so infinitesimal as to require no consideration upon any health basis, and was strong proof of the extravagance in destroying animals by the test alone.

Only three of the remaining animals failed to pass the test applied December 9, and in one of the three the disease had developed sufficiently to be detected by physical examination and was condemned. These three were isolated from the balance of the herd and their milk thrown away. They were again tested February 23, with no material change in the result, and were taken to Concord March 29 and destroyed and examined in the presence of many witnesses. The one condemned by physical examination was found to be a well-developed case of tuberculosis and should be destroyed. Although the other two, killed at the same time, had failed to pass the test, there was no physical evidence of disease, and they were destroyed for the purpose of ascertaining their condition and for the information sought in the experiment. After a very thorough postmortem examination by a veterinarian slight evidence of disease was finally found, but it was even less than that found in the bull and was in such condition as to lead to the conclusion that it had not only been arrested, but was on the way to ultimate recovery. How much this result was due to the treatment of the animals and how much to the alleged curative qualities of tuberculin is a matter of conjecture only. There are no developments of science in regard to the nature and characteristics of bovine tuberculosis that warrant the destruction of such animals. The remaining six animals were tested with tuberculin February 23 and May 9, and all passed the test each time. The following correspondence passed between the commissioners and Mr. Shedd:

CONCORD, June 18, 1898. 1

MR. F. B. SHEDD, *Tilton, N. H.*

DEAR SIR: When we took the ten Holstein cattle from your place nearly one year ago, the statement was made to you that it was not the policy of the board to destroy such herds as yours appeared to be simply from the fact that the ten animals had failed to pass the tuberculin test. We remarked at the time that we had a desire to study the development of the disease in such cattle for a year or more, and with your accustomed liberality and public spirit you offered to contribute the ten reacting animals free for the purpose of the experiment, cattle that were at least worth \$1,000 at that time. We accepted your generous offer, and, as the year is nearly elapsed, it is due that we make a brief report to you and ask for suggestions in regard to further action.

During this period we have destroyed four of the ten animals, and you have been present at the postmortem of each. One of these showed physical symptoms of the disease soon after it came into our possession and was condemned by the board. The other three showed no physical symptoms of the disease and were selected for reasons well known to you, and which it is not necessary to state here. You will recall the fact that the postmortem of each revealed no disease sufficient to warrant destroying the animals or sufficient to cause any danger, except in the one physically condemned. The others were killed for the purpose of the experiment, and the results are carefully recorded and will be published in full. The milk of none of the cows killed had been sold since we took charge of the animals.

We now have at East Andover the remaining six animals. They have passed the tuberculin test at the last two trials made in February and May, and from any kind of an examination that we are able to make appear to be healthy cattle. Since passing the test the milk has been sold, with the approval of the State Board of Health, the city board of health, and the milk contractors, all of whom have been fully acquainted with the history and condition of the animals and furnished the result of the tuberculin test. There has been no expense to the State for these cattle for the past six months. In view of these facts there seems to be no reason why these cattle should not be put to practical use, and we ask you for suggestions in regard to what shall be done with them. Shall we return them to you? We will gladly do this, if you desire. If not, there seem but two courses open, one of which would be to kill them at once. This would seem extravagant, and warranted only for the purpose of obtaining some information in regard to the effect of repeated applications of tuberculin. The other course would be to keep the cattle for another year at



least and watch developments. Whatever is done, the detailed report of the experiment to the present time can be made, and will be a valuable contribution to the information obtained in regard to this important matter. We await with deep interest any suggestions from you in regard to this matter.

Assuring you of our full appreciation of your liberality and public spirit in donating the animals for the purpose of this experiment and of willingness to return them if you desire,

Yours, truly,

N. J. BACHELDER, *Secretary.*

Mr. Shedd's reply:

TILTON, N. H., *June 21, 1898.*

N. J. BACHELDER, Esq., *Secretary, Concord, N. H.*

DEAR SIR: I have your favor of June 18, and note what you say with regard to the condition of the cattle remaining in your hands of the herd given by me to your commission for the purpose of obtaining information by experiment upon the very important question of the existence and progress of the disease, tuberculosis, with which it was charged they were infected, after having reacted under the inoculation with tuberculin while in my possession.

I remember the consistent and conservative opinion expressed by you at the time when first your attention was called to the matter and the reasonable course recommended with regard to the treatment of the herd. While from lack of experience and perhaps prejudice I was compelled to differ from the judgment expressed by you, and for the reason that I felt that I could not consistently use the product of cattle that modern science had pronounced diseased, I felt constrained to make such disposition of them as would remove them from the balance of my herd and prevent any possibility of further contamination, not only of my own but of my neighbors' cattle.

The investigations made by your board, of which I have been made aware from time to time, and the information obtained therefrom have substantially changed the radical opinion I have heretofore entertained with regard to the prevalence of the disease generally, and especially with regard to the propriety of condemning any and all cattle which might "react" under the tuberculin test. The examination by your commission of the cattle destroyed, after repeated applications of the tuberculin test, has determined to my satisfaction the fact that judgment based upon that alone is not a safe reliance and that cattle should not be destroyed without other evidence of the presence of disease. You will remember that it was upon this point mainly that we disagreed. I am now convinced of the correctness of your judgment upon the question, and while the experiments have not resulted as I expected, I feel satisfied that your investigations will prove of great value to everyone interested in cattle, and will do much toward the proper solution of a very important problem.

Your claims as to the superior value of the physical examination in determining the extent of the disease have, in my opinion, been fully sustained, and I am now quite ready to agree with you that it is the more reliable method, and that cattle in which the presence of disease can not be determined in this way should not be destroyed.

There remains, however, this question to be solved, and I shall be interested to hear an expression from you upon it: Assuming that the tuberculin test, as applied by me in the beginning, demonstrated the presence of the disease in however slight a form, is it possible that repeated inoculations have not only checked its further development, but effected a complete cure? This, I believe, it was claimed tuberculin would do when it was first offered to the medical profession. If so, such treatment would be of inestimable value.

With regard to the disposition of the six cows remaining in the hands of your commission: As you are aware, they were regarded by me as being of greater value than as mere producers of milk. They were remarkably promising, and were desirable for breeding purposes. Three of them produced each about 40 pounds of milk with their first freshening, and this without other than ordinary feeding. What they might have done with extra feed we are not advised, but it is fair to presume that they were of sufficient promise to warrant being kept for the improvement of the herd.

I judge from your letter that you do not feel it necessary for the furtherance of the experiment that they should be destroyed, which course is in harmony with the opinion expressed by you in the beginning; and I also note your generous offer to return them to me. I scarcely know what to say to this proposition. When I turned over the herd to your commission, as a matter of fact, I expected to relinquish all right to them and to whatever value they represented, expecting and intending to place such value as an offset to whatever expense the State of New Hampshire might be compelled to bear in the conduct of the experiments that

were to be made with them. However, if your board shall feel that it will be as well to return them to me as to keep them longer and to continue to experiment with them, I shall be satisfied to receive them. This I will be pleased to leave with your board to decide, expressing in advance my entire satisfaction with whatever decision you may make.

In closing, I beg to express to your board and to you personally my appreciation of the many courtesies received at your hands, and my sincere thanks for the interest you have taken in the investigation of a question of so much importance to every farmer and to every citizen in the State.

Yours, respectfully,

F. B. SHEDD.

The cattle were returned to Mr. Shedd June 24, and the experiment closed.

IRVING A. WATSON, *President*.

N. J. BACHELDER, *Secretary*.

The action of the board was, however, criticised in certain quarters, undoubtedly for special and individual purposes, and we therefore determined to destroy the animals and make a careful postmortem examination, in order to determine whether or not our conclusions were correct. Accordingly, August 1 they were killed and an autopsy made in the presence of the commissioners, a competent veterinary surgeon, and several witnesses, with the following results:

A careful autopsy was made in each case. All the internal organs were searched for evidences of disease, which were found only as stated below.

No. 1 (3790). A small encysted mass, as large as a medium-sized walnut, was found near the apex of one lung. Two of the bronchial glands were somewhat enlarged and filled with caseous matter of a thick consistency. These were the only lesions found. No evidence of recent inflammatory action or pus. All the other organs were in a healthy condition.

No. 2 (52). Two of the bronchial glands were enlarged and filled with caseous matter. On a small portion of the left lung, adjacent to the fifth rib, were found granulations, probably miliary, and which also appeared in a small patch on the ribs contiguous to the granulations on the lung. No inflammatory condition existed, and no other evidence of disease was found.

No. 3. Bronchial lymphatics slightly enlarged and containing a small amount of cheesy material, apparently encysted. No other evidence of disease.

No. 4 (366). A small nodular, encysted mass, of the size of an ordinary marble, was found in the apex of one lung. No other evidence of disease.

No. 5 (363). In one of the bronchial glands was found a small mass of caseous matter, cylindrical in shape, about one eighth of an inch in diameter and more than an inch in length, partly calcified. No other evidence of disease.

No. 6 (362). In the upper part of one lung was found a caseous deposit, encysted, the size of a small walnut, with some calcification. In the lower part of the lung was an encysted nodule, about the size of a small cherry, containing caseous matter. No other evidence of disease.

In all the above-mentioned cases a careful examination was made of those organs most likely to be tuberculous, including lungs, liver, heart, stomach, bowels, kidneys, uterus, mammary glands, mesentery, lymphatic, and pigmentary glands—in fact, everything except the brain and spinal cord, which it was not deemed necessary to explore.

All the cows were in an excellent condition, and probably would have passed through most, if not all, slaughtering houses without any disease being discovered, with, perhaps, the single exception of case No. 2, in which the granulations upon the lung, being upon the outer surface, were apparent upon the removal of that organ.

The result of this experiment had great influence in determining the future course of this board. Nearly fifteen months after these six cattle reacted to the

tuberculin they were killed and thoroughly examined, with only the slight traces of the disease as indicated above. This board regards tuberculin, in the hands of a skillful and experienced person, as the most reliable diagnostic agent in this matter; but it also holds a physical examination by a skillful and experienced veterinarian as the most practical course to pursue in the destroying of tuberculous animals. Such a course is believed to be the most practical method of dealing with the disease. Every animal, previous to being destroyed, has been examined and condemned by a qualified veterinarian selected by this board.

## CONCLUSIONS.

Our experience and study in the suppression of bovine tuberculosis convinces us that the enforcement of proper sanitary measures for preventing the development of the disease is as important as destroying diseased animals. A stable once thoroughly infected with tuberculous germs is a very prolific source of the disease, even years later, unless thoroughly disinfected. We have given directions to the owner of every stable inspected in regard to the action required in the matter of ventilation, light, exercise of animals, and disinfection, and have regarded this as the most important part of the work. Many stables have been visited very recently to ascertain if the suggestions have been carried out, and we found that the changes suggested have been invariably made, and that the sanitary conditions of those stables have been greatly improved. Quite a thorough investigation of the conditions existing in the sections of the State where the disease has been found the most prevalent reveals the fact that great progress has been made in its suppression, and in some towns it seems to be almost eradicated.

\* \* \* \* \*

Investigation made by the board in various directions demonstrates the correctness of the general statement found in these printed communications,<sup>1</sup> that bovine tuberculosis has been very materially reduced among the herds of the State, and warrants the further statement that New Hampshire cattle are in a comparatively healthy condition, and that their product is as wholesome as a more radical and expensive policy on the part of the commission would have secured.

We desire to emphasize the statement made in previous reports of this board, and already made in this report, that the adoption of preventive measures on the part of stock owners is a matter of equal importance in the permanent suppression of bovine tuberculosis with the destroying of diseased animals. Such matters as ventilation, sunlight, exercise, and judicious feeding are of the greatest importance, and any action that will lead to a more general adoption of these preventive measures will greatly aid in securing the result contemplated. We have less doubt than ever before in regard to the wisdom of the policy adopted and followed by the New Hampshire cattle commission, and believe it to be the most practical method of dealing with bovine tuberculosis. In order to demonstrate that this policy is supported by the organizations most interested in the matter, both from the standpoint of public health and agriculture, we here submit the action taken by the several organizations referred to in this connection, and which have been kept fully informed from time to time of the policy adopted.

IRVING A. WATSON, *President*,  
N. J. BACHELDER, *Secretary*,  
*State Board of Cattle Commissioners.*

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<sup>1</sup> Reports from 40 towns not printed here.



## CERTIFICATES.

STATE OF NEW HAMPSHIRE,  
BOARD OF AGRICULTURE,  
*Concord, December 14, 1898.*

At a meeting of the Board of Agriculture held December 15, 1898, the following action was taken:

*Resolved*, That this board approves the action taken by the New Hampshire cattle commission, and indorses the policy pursued as one calculated to serve the health and live-stock interests in the most practical and economical manner, and has no change to suggest in the management of this important matter.

A true copy of record

Attest:

N. J. BACHELDER, *Secretary.*

NEW HAMPSHIRE STATE GRANGE,  
OFFICE OF EXECUTIVE COMMITTEE,  
*Concord, December 9, 1898.*

This is to certify that the executive committee of the New Hampshire State Grange has been kept fully informed, from time to time, in regard to the work of the State cattle commission, and hereby declares that it is in full accord with the policy pursued, believing it to be the most practical course of suppressing bovine tuberculosis and other contagious diseases of animals. We have noted the result of the experiment conducted with the Holstein herd of cattle and recognize great value to the live-stock interest of the State therefrom.

E. C. HUTCHINSON,  
*Secretary Executive Committee.*

N. J. BACHELDER,  
*Secretary Board of Cattle Commissioners, Concord, N. H.*

DEAR SIR: I have been very much interested in the work of the Board of Cattle Commissioners, believing that they are doing very much for the State of New Hampshire. From such information as I have had, it would seem that your work is for two specific reasons: First, the suppression of tuberculosis in cattle to further the public health interests of the State; second, the control of the disease in the financial interests of the stock raiser and farmer. The State Board of Health is especially interested in this work from the standpoint of the first proposition, and we believe that every possible effort should be made to protect the public against disease infection through tuberculous meat and milk. To accomplish this end I believe it is the opinion of most scientists that it is unnecessary to destroy every animal that reacts to the tuberculin test, and that it is unnecessary to test with tuberculin every herd of cattle in the State. It would seem that if a careful and systematic inspection of cattle could be made by competent veterinary surgeons, with the destruction of all animals in which tuberculosis could be discovered upon a careful physical examination, the work would meet all public requirements. I understand that, as far as the law will admit, the work is now being conducted along these lines, and as far as I know is meeting with general approval.

I believe that the law should be amended so as to require an inspection of all dairies and milch cows with such frequency as might be deemed necessary, and that the commission should have power to establish rules and regulations governing the sanitary condition of the stables of all dairy herds.

Very respectfully, your most obedient servant,

G. P. CONN, M. D.,  
*President State Board of Health.*



## NEW JERSEY.

The tuberculosis work of New Jersey is performed chiefly under the act of April 6, 1898, and is in the hands of seven persons, who are known as the State Tuberculosis Commission. This commission acts upon notice from the Secretary of the State Board of Health, State Dairy Commissioner, and also any owner of animals supposed to be diseased with tuberculosis. It shall enforce any regulations that it may adopt.

Indemnity for slaughtered animals is based upon appraisement, the amount paid being three-fourths of the appraised value; but the appraisement shall not exceed \$40 for each animal.

The sum of \$10,000 is appropriated to the commission "for defraying the expenses and for the payment of the proportion of the appraised value of slaughtered animals."

The commission shall have power to cooperate with the Bureau of Animal Industry in any general national system which may be adopted to prevent the spread of bovine tuberculosis.

The importation of dairy cows and neat cattle for breeding purposes is prohibited, except when accompanied by certificate of reliable inspector and have been subjected to the tuberculin test. Transportation companies are prohibited from bringing into the State any such animals not accompanied by the said certificate, and persons who import such animals shall notify the secretary of the commission of the date of importation and number of cattle, their destination, etc. Provision is made for the importation of cattle from States not issuing certificates of inspection.

Cattle brought into the State without a certificate shall be subjected to the tuberculin test, and those which react shall be slaughtered; but no indemnity is paid for such slaughtered animals.

The penalty for violation of the act is not less than \$25 nor more than \$200 for each offense, or by imprisonment of not less than one month or more than six months, or by both such fine and imprisonment; and for a second offense by an imprisonment of not less than six months and not more than one year.

The sum of \$500 is appropriated for the enforcement of the act to prevent the importation of tuberculous cattle into New Jersey.

AN ACT concerning contagious and infectious diseases among animals, and to repeal certain acts relating thereto. (Approved May 4, 1886.)

1. *Be it enacted by the Senate and General Assembly of the State of New Jersey,* That in case any contagious or infectious disease shall appear or be suspected to exist in any locality in this State, it shall be the duty of all persons owning or having any interest in animals infected or supposed to be infected, and of any person having knowledge or suspicion thereof, at once to notify the State Board of Health, or some officer or member of said board, of the facts, and it shall be the duty of the said board, upon receiving such information, or any information in regard thereto, to investigate the same, or cause the same to be investigated, and

if any such disease is found to exist, or likely to break out, to quarantine such animal or animals and to take such precautionary measures with relation to other animals exposed to such disease as shall be deemed necessary, and to enforce such regulations in relation to such diseases as the said board may adopt.

2. *And be it enacted*, That whenever, in the judgment of the said board, its agents or appointees, it shall appear that such disease is not likely to yield to remedial treatment, or that the expense of such treatment will be greater than the value of the animal or animals infected, and when in any case such disease is likely, in the judgment of said board, its agents or appointees, to be communicated to other animals, they shall cause the animals infected to be immediately slaughtered, their remains to be buried at least 4 feet beneath the surface of the ground, and all places in which the same have been kept to be thoroughly cleansed and disinfected.

3. *And be it enacted*, That when any animal or animals shall be slaughtered, as directed in the preceding section, the value of the same may, at the request of said board or any person interested, be ascertained and appraised by three disinterested freeholders resident in this State, who shall make and sign a certificate thereof in the presence of a witness, who shall attest the same; such appraisement shall be made on the basis of the market value of the animal or animals slaughtered just prior to the time when they became so diseased, and shall be limited to the sum of \$100 for registered animals, and to \$40 for all others; one-half of the valuation so ascertained shall be paid by the State on the presentation of such certificate, with the approval of the said board indorsed thereon, to the owner or owners.

4. *And be it enacted*, That when any herd or portion thereof has been or is so exposed to any contagious or infectious disease, and the State Board of Health deem the disease likely to spread to that portion of the herd still unaffected, although isolated or quarantined, said herd may, with the consent of the owner or owners, and with the restrictions agreed upon between them and the executive officer of the State Board of Health, cause or allow said herd or herds to be inoculated for the prevention of such diseases as can be thus mitigated; but any loss resulting from such inoculations shall not constitute any claim against the State or the Board of Health: *Provided*, That inoculation for pleuropneumonia shall in no case be allowed without the consent and approval of the State Board of Health, and shall be made under its direction.

5. *And be it enacted*, That when any city, township, or district shall be threatened with any contagious or infectious disease among animals to such an extent as to seem to require more general precautions, the State Board of Health shall notify the local board of health, and, with the advice and consent of the local board of health, may for a time prohibit the bringing of any cattle into such city, township, or district without inspection and a written permission, and may prohibit the running at large of animals in any township, if not already prohibited by law, for such time as the township board of health shall advise, and the State Board of Health may call upon local boards of health to discover and report cases of contagious disease and aid in measures for its abatement and prevention.

6. *And be it enacted*, That when any animal or herd of animals is held in quarantine under authority given by the laws of this State to the State Board of Health, it shall not be lawful for the owner or keeper thereof to add any animals to such herd, by purchase or otherwise, without the written consent of said board, under penalty of being adjudged guilty of a misdemeanor and fined therefor to an amount not exceeding \$100.

7. *And be it enacted*, That any person or persons refusing or neglecting to notify said board of health, or any of them, of the existence of pleuropneumonia, rinderpest, or any other contagious or infectious disease among animals, shall be deemed

and adjudged guilty of a misdemeanor, and upon conviction shall be punished by a fine of not more than \$200 or by imprisonment not exceeding one year, or both, at the discretion of the court, and that if any person or persons shall knowingly buy or sell, or cause to be bought or sold, any animal or animals affected with the pleuropneumonia, rinderpest, or any other contagious or infectious disease, or that has been exposed to a contagious or infectious disease, or is a part of any herd or stock held in quarantine, all such person or persons shall be deemed and adjudged guilty of a misdemeanor, and upon conviction thereof shall be punished by a fine not exceeding \$200 or imprisonment not exceeding one year, or both, at the discretion of the court.

8. *And be it enacted*, That when, by reason of the locality of an infected animal or herd within a city, or by reason of frozen ground or extreme heat, it is, in the judgment of the State Board of Health, or those acting under its authority, inexpedient or impossible to bury any such dead or slaughtered animals on the premises, the board may authorize the veterinarian, acting for said board, to slash the skin and cut the flesh of the same, and, either under his direct oversight or that of the city board of health or contractor for the disposal of dead carcasses, to give over the same to the use of a bone-boiling or glue or other establishment for the disposal of dead animals, but in no case shall the same or any part thereof be disposed of for food, and any such disposal of the same shall make the party or parties concerned guilty of a misdemeanor and punishable by a fine not to exceed \$100 or imprisonment in the county jail for a period not exceeding six months.

9. *And be it enacted*, That if, between the first day of October and the first day of May of any year, a veterinarian, who has been regularly graduated in veterinary medicine, desires to make a postmortem examination of any animal he has attended, or at the request of the owner of any animal that has died within the city limits, he may do so, if such examination is made within twenty hours of the death or slaughter of said animal: in every such case he shall notify the city scavenger or remover of carcasses of animals of the hour of his examination, and said scavenger shall arrange to remove the carcass in not more than three hours after the beginning of said examination.

10. *And be it enacted*, That it shall be the duty of the State Board of Health to keep a full and complete record of all the proceedings under this act and report the same annually to the State Board of Agriculture, and such report shall be printed in and form a part of the annual report of said board of agriculture.

11. *And be it enacted*, That the sum of \$2,000 is hereby annually appropriated to the State Board of Health to defray the expenses of the said board in the duties imposed by this act, and that the Governor, Secretary of State, and the Comptroller be, and they are hereby, authorized to determine what sum annually shall be allowed to said board or any member thereof for services in the oversight and execution of the duties hereby imposed, but the amount allowed shall not exceed the sum of \$500 in any one year.

12. *And be it enacted*, That if, on account of the prevalence of any contagious disease of animals, or the necessary guarding against the same, any greater expenditure shall seem to be required, the State Board of Health shall present the facts to the Governor, the Secretary of State, and the Comptroller, who shall authorize such additional amount as they may think necessary, but in no case shall the yearly amount thus authorized to be expended exceed \$5,000.

13. *And be it enacted*, That all bills for money expended under this act shall be audited by the Comptroller of this State, and then submitted to the Governor for his approval, and after being thus audited and approved by the Governor, shall be paid by the State Treasurer upon warrant of the Comptroller.

14. *And be it enacted*, That the following acts, to wit: (1) A supplement to an act entitled "An act to establish a State Board of Health," approved March 9,



1877, which act was approved on the 12th day of March, 1880; (2) A further supplement to an act entitled "A supplement to an act entitled 'An act to establish a State Board of Health.'" approved March 9, 1877, which supplement was approved March 12, 1880, which further supplement was approved on the 23d day of March, 1881; (3) A supplement to an act entitled "An act to establish a State Board of Health," approved March 9, 1877, which supplement was approved March 12, 1880, and also a supplement to the further supplement to said act, approved March 23, 1881, which supplement was approved March 17, 1883; (4) Supplement to act entitled "An act to establish a board of health," approved March 9, 1877, and to supplements thereto relating to the contagious diseases of animals, which supplement was approved on March 23, 1883, and all other acts and parts of acts inconsistent with the provisions hereof, be, and the same are, repealed; but any rights acquired under the said acts, or either of them, and any suits pending under the same shall not be affected by the repeal.

15. *And be it enacted*, That this act shall take effect immediately.

A SUPPLEMENT to an act entitled "An act concerning contagious and infectious diseases among animals and to repeal certain acts relating thereto," approved May 4, 1886. (Approved May 22, 1894.)

Whereas it is said that tuberculosis in cattle prevails in some sections of this State, whereby the health of our citizens is imperiled: Therefore.

SECTION 1. *Be it enacted by the Senate and General Assembly of the State of New Jersey*, That the President of the State Board of Agriculture shall appoint five persons, citizens and taxpayers of this State, who, together with himself and the Secretary of the State Board of Agriculture, shall constitute a commission, who shall, at the request of two members of the State Board of Health or the State Dairy Commissioner or any owner of suspected animals, investigate the existence of tuberculosis, or cause the same to be investigated, and if any such disease is found to exist, to enforce such regulations in relation to the same as the said commission may adopt.

SEC. 2. *And be it enacted*, That when any animal or animals shall be slaughtered by direction of said commission, the value of the same shall be ascertained and appraised by three disinterested freeholders, resident in this State, who shall make and sign certificates thereof in the presence of a witness, who shall attest the same. Such appraisement shall be made on the basis of the market value of the animal or animals slaughtered just prior to the time when they became so diseased, and shall be limited to the sum of \$100 for registered animals and to \$40 for all others. One-half of the valuation so ascertained shall be paid by the State on the presentation of such certificate, with the approval of the said commission indorsed thereon, to the owner or owners.

SEC. 3. *And be it enacted*, That it shall be the duty of said commission to keep a full and complete record of all their proceedings under this act and report the same annually to the State Board of Agriculture, and such a report shall be printed in and form a part of the annual report of the State Board of Agriculture.

SEC. 4. *And be it enacted*, That the sum of \$5,000 is hereby annually appropriated to said commission to defray its expenses and the value of the cattle to be slaughtered by its direction: *Provided*, That no other compensation shall be allowed said commission than the expenses actually incurred in the execution of the duties hereby imposed.

SEC. 5. *And be it enacted*, That all bills for money expended under this act shall be audited by the Comptroller of this State and then submitted to the Governor for his approval; and after being thus audited and approved by the Governor shall be paid by the State Treasurer upon the warrant of the Comptroller.

SEC. 6. *And be it enacted*, That this act shall be deemed a public act and shall take effect immediately.



A FURTHER SUPPLEMENT to an act entitled "An act concerning contagious and infectious diseases among animals, and to repeal certain acts relating thereto," approved May 4, 1886. (Approved March 28, 1895.)

*Be it enacted by the Senate and General Assembly of the State of New Jersey,* That the second section of the act entitled "A supplement to an act entitled 'An act concerning contagious and infectious diseases among animals, and to repeal certain acts relating thereto,'" approved May 4, 1886, which supplement was approved May 22, 1894, be, and the same is hereby, amended to read as follows:

"SEC. 1. That it shall be lawful for the State Tuberculosis Commission to employ one of their number as secretary of the commission, and to fix by resolution such compensation for his services as they, in their judgment, may deem reasonable, which compensation shall be paid in monthly installments, out of the appropriation to said commission, by the State Treasurer upon the warrant of the State Comptroller.

"SEC. 2. That when any animal or animals shall be slaughtered by direction of said commission the value of the same shall be ascertained and appraised by three disinterested freeholders, resident in this State, who shall make and sign certificates thereof in the presence of a witness, who shall attest the same; such appraisal shall be made on the basis of the market value of the animal or animals slaughtered, and shall be limited to the sum of \$100 for registered animals and to \$40 for all others: three-fourths of the valuation so ascertained shall be paid by the State on the presentation of such certificate, with the approval of the said commission indorsed thereon, to the owner or owners: *Provided*, No compensation shall be made for animals considered by the commission to be of no value.

"SEC. 3. That whenever the State Tuberculosis Commission shall have made, or caused to be made, any examination of any animal or herd of animals within this State, and shall have ascertained such animal or herd of animals to be sound and in good health, they shall, upon request from the owner thereof, give to him a certificate in writing, signed by the president and secretary of said commission, certifying to the fact of such examination and of the good health and condition of such animal or herd of animals.

"SEC. 4. That the said State Tuberculosis Commission shall have the power to cooperate with the Bureau of Animal Industry of the United States in any general national system which may be adopted by such Bureau for the prevention of the spread of bovine tuberculosis and its eradication in the United States and its Territories.

"SEC. 5. That there shall be appropriated to the said State Tuberculosis Commission the sum of \$5,000 for defraying its expenses and for payment of the proportion of the appraised value of slaughtered animals required to be paid out of the Treasury of this State, all which payments and expenses shall be made by the Treasurer of this State upon the warrants of the State Comptroller; that in cases of emergency the said commission may, with the consent of the Governor, Comptroller, and Treasurer, in addition to the sum of money hereby appropriated, expend such further sums of money for the purposes of this act, not to exceed in the whole the sum of \$5,000 in any one year.

"SEC. 6. That all acts and parts of acts inconsistent with this act be, and the same are hereby, repealed, and that this act shall take effect immediately."

A FURTHER SUPPLEMENT to an act entitled "An act concerning contagious and infectious diseases among animals, and to repeal certain acts relating thereto," approved May 4, 1886. (Approved April 6, 1898.)

*Be it enacted by the Senate and General Assembly of the State of New Jersey:*

SECTION 1. The second section of the act entitled "A supplement to an act entitled 'An act concerning contagious and infectious diseases among animals, and to repeal certain acts relating thereto,'" approved May 4, 1886, which supplement

was approved May 22, 1894, and which further supplement was approved March 28, 1895, be, and the same is hereby, amended to read as follows:

SEC. 2. Whenever the State Tuberculosis Commission shall be notified by the Secretary of the State Board of Health or the State Dairy Commissioner or any owner or owners of dairy animals requesting them to inspect animals supposed to be diseased with tuberculos's, such person as may be designated by the commission shall proceed to make such inspection and may agree with the owner or owners upon a valuation of such animals as are to be inspected. In cases where no agreement can be reached the person designated by the commission shall choose one disinterested freeholder, the owner or owners shall choose one, and the two shall designate a third, who shall ascertain and decide upon the market value of each animal to be examined by the commission, and shall sign certificates thereof in the presence of a witness, who shall attest the same. Such valuation shall in each case be made on the basis of the market value of the animals the day the valuation is made; and if, upon examination by the commission, any animals in said herd are condemned to be slaughtered, three-fourths of such valuation so ascertained shall be paid by the State to the owner or owners on presentation of such certificate with the approval of the said commission indorsed thereon: *Provided*, Such appraisement shall not exceed \$40 for each animal condemned: *And provided further*, That no compensation shall be made for animals considered by the commission to be of no value.

SEC. 3. Section 5 of said act be amended to read as follows: "SEC. 5. There shall be appropriated to the State Tuberculosis Commission the sum of \$10,000 for defraying the expenses and for the payment of the proportion of the appraised value of slaughtered animals under this act, all which payments and expenses shall be made by the Treasurer of this State upon the warrant of the State Comptroller: *Provided*, That no payments shall be made pursuant to this act until the amount thereof shall have been included in the annual appropriation bill."

SEC. 4. This act shall take effect immediately.

AN ACT to prevent the importation of tuberculous cattle into the State of New Jersey.  
(Approved March 24, 1899.)

*Be it enacted by the Senate and General Assembly of the State of New Jersey:*

1. The importation of dairy cows and neat cattle for breeding purposes into the State of New Jersey is hereby prohibited, excepting when such cows and neat cattle are accompanied by a certificate from an inspector whose competency and reliability are certified to by the authorities charged with the control of the diseases of domestic animals in the State from whence such cattle came, certifying that they have been examined and subjected to the tuberculin test and are free from disease.

2. All railroad, steamboat, ferryboat, and other carrying companies are forbidden to receive cows and breeding cattle in any other State for transportation to any destination within the State of New Jersey, unless such cattle are accompanied by the required certificate, as set forth in Section 1 of this act: and all persons importing cows into the State of New Jersey shall without delay and before disposing of such animals notify the Secretary of the State Tuberculosis Commission, giving date of importation and number of cattle imported and their destination within the State with the certificate of inspection of the State official within the State from whence they came: *Provided*, That when it is desired to import such cattle from States not provided with persons with authority to issue such certificates, the Secretary of the State Tuberculosis Commission may issue a permit for the admission of such cattle to be subjected to examination, as provided for in Section 3.

3. In case cows or breeding cattle shall have been imported into the State without the required certificate and permit provided for in Section 1 of this act, or on

the permit of the Secretary of the State Tuberculosis Commission, as provided for in Section 2 of this act, it shall be the duty of the State Tuberculosis Commission to cause all such animals to be examined to detect the presence of tuberculosis, and may cause them to be subjected to the tuberculin test, and to see that all such animals giving indications of tuberculosis are slaughtered. No indemnity shall be paid by the State to the owner or owners of any tuberculous cattle that have been brought into the State without a certificate of having successfully stood the tuberculin test after November 1, 1899.

4. Any person or persons violating this act shall be guilty of a misdemeanor and, on conviction thereof, shall be punished by a fine of not less than \$25 nor more than \$200 for every such offense, or by an imprisonment for not less than one month nor more than six months, or by both such fine and imprisonment, and for a second offense by an imprisonment of not less than six months and not more than one year.

5. The sum of \$500, or so much thereof as may be necessary, is hereby appropriated to the State Tuberculosis Commission for the enforcement of the provisions of this act, provided said amount is included in the annual appropriation bill, and the State Tuberculosis Commission is hereby empowered to enforce the provisions of this act, and to make such rules and regulations as may be necessary and proper for its enforcement.

6. This act shall take effect November 1, 1899.

#### RULES FOR THE ENFORCEMENT OF THE ACT OF MARCH 24, 1899.

I. No person is permitted to bring into the State of New Jersey dairy cows and cattle for breeding purposes, no matter what their condition, and dispose of the same, without having previously notified the Secretary of the State Tuberculosis Commission, giving date of importation, number of cattle imported, and their destination within the State. Such notice must be accompanied by the number and a full and accurate description of the cattle, the names and addresses of the owner and consignee, the date upon which they are to be brought into the State, the route over which they are to be driven or shipped, and the destination. A blank form to use in rendering this report will be sent upon application to the State Tuberculosis Commission. Having thus given notice, dairy cows and cattle for breeding purposes may be brought into the State of New Jersey in accordance with the following provisions:

II. The cattle may be examined and tested with tuberculin in the State from whence they come by an inspector whose competency and reliability are certified to by the authorities charged with the control of the diseases of domestic animals in that State. Special blanks for reporting upon such examinations and tags for marking and numbering those that pass the examination will be furnished by the State Tuberculosis Commission upon application. Cattle thus examined and found to be free from disease, brought into New Jersey, shall remain in the possession of the person or persons who own them when brought into New Jersey until the inspection reports have been approved by a member of the State Tuberculosis Commission, or by an agent authorized to approve such reports. After such approval the cattle can be disposed of without restriction.

III. When it is desired to bring cattle into the State of New Jersey from States having no official with authority to issue certificates of inspection (the owner having previously conformed to Rule I), such cattle may be brought in by a permit for their admission issued by the Secretary of the State Tuberculosis Commission. Such cattle, when so admitted, must be held in quarantine until they are examined for the existence of tuberculosis by the State Tuberculosis Commission. After such examination all cattle approved by the State Tuberculosis Commission or its agent may be disposed of without further restriction. Any



cattle found to be affected with tuberculosis shall, after such examination, be slaughtered, and no indemnity for such condemned cattle shall be allowed the owner or owners thereof.

IV. In all examinations cattle that are approved by the test should be marked with a metal tag furnished by the Commission, and the number and description of the animal should correspond with the number on the tag.

NOTE.—This law and these rules do not apply to cattle shipped directly through New Jersey to other States.

Approved by the State Tuberculosis Commission, September 1, 1899.

FRANKLIN DYE, *Secretary*.

## NEW MEXICO.

In New Mexico tuberculosis is specified as one of the contagious diseases of cattle against which legislation is directed.

Whenever the Cattle Sanitary Board has reason to believe that a contagious or infectious disease exists in any locality they shall employ a veterinarian to examine into the facts and, if it is deemed necessary, quarantine such cattle, as well as those which have been exposed to the disease. If it is the opinion of the veterinarian that such diseased or exposed animals should be slaughtered in order to stamp out and prevent the spread of the disease, he reports the same to the Sanitary Board, who causes the slaughter of such cattle. Before their slaughter, however, they are appraised, and the owner is paid the sum appraised out of the cattle indemnity fund, which is provided by a special tax.

No indemnity is paid for cattle which were diseased when brought into the Territory, nor in cases where the owner knew or had reason to believe that they were diseased, nor for cattle brought into the Territory contrary to law. Any owner who may not be satisfied with the appraisement may appeal to the district court, but such appeal shall not delay the slaughtering of the cattle.

The Cattle Sanitary Board is also empowered to employ an attorney to give advice and assist in the enforcement of the law.

## LAW.

AN ACT for the prevention of contagious diseases among cattle. (Approved March 18, 1897.)

SEC. 226. Whenever the Cattle Sanitary Board of this Territory shall have reason to believe that contagious pleuropneumonia, tuberculosis, or any other contagious or infectious disease fatal to cattle exists or has become epidemic upon any premises or in any locality in this Territory, it shall be the duty of said board to employ a competent veterinarian, who shall examine and, if deemed necessary, quarantine, under such rules and regulations as the said board may prescribe, all cattle suspected of being diseased or that have been exposed to such disease.

SEC. 227. Whenever it shall be necessary, in the opinion of said veterinarian, in order to stamp out and prevent the spread of such disease, that the diseased cattle and those that have been exposed thereto, should be slaughtered, he shall report the same to said Sanitary Board, and if the said board be satisfied of the correctness of said report and the necessity therefor, they shall cause such cattle to be slaughtered under the direction of the board or said veterinarian, and the carcasses to be disposed of as the board may direct.



SEC. 228. Prior to such slaughtering the board shall appoint one disinterested person, resident of the county wherein such cattle are to be slaughtered, who shall act with a like disinterested person to be appointed by the owner of such cattle, and fix the price to be paid out of the cattle indemnity fund or the funds realized from the special tax provided for in Section 20 of Chapter 106, Session Acts of 1889, as an indemnity for the slaughter of such animals, and in event said two appraisers are unable to agree, they shall choose a third disinterested resident of said county to act with them in such appraisal.

SEC. 229. All claims for indemnity for cattle slaughtered under the provisions of this act shall be presented to the board, with the sworn certificate of such appraisers, and shall be paid out of any funds at the disposal of said board not otherwise appropriated: *Provided*, That no indemnity shall be paid for cattle which were diseased when brought into this Territory or which the owner thereof knew or had reason to believe were so diseased when they came into his possession, nor for any cattle brought into the Territory contrary to law. Any person aggrieved by such appraisal and award may appeal to the district court for the county in which said cattle were slaughtered, but such appeal shall not delay the slaughtering of such cattle; and such appeal shall be docketed and tried as appeals from justices of the peace are docketed and tried.

SEC. 230. Any person or persons, or the agent or employe of any firm or corporation who shall refuse to permit animals suspected of being diseased to be inspected, quarantined, or slaughtered, as provided in this act, or who shall wilfully interfere with said veterinarian or the Sanitary Board, or any of its officers or employes in the discharge of their duties in relation to the inspection, quarantine, or slaughter of such animals, shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be fined for such offense in a sum of not less than \$50 nor more than \$100, or imprisoned in the county jail for not less than thirty nor more than sixty days, or both such fine and imprisonment, in the discretion of the court or justice trying the case.

SEC. 231. The Cattle Sanitary Board of New Mexico shall have authority to employ a competent attorney to give advice and counsel in regard to any matter connected with the duties of the board, to represent the board in any legal proceedings, and to aid in the enforcement of the laws in relation to live stock, and to fix the compensation to be paid to such attorney.

For the purpose of providing funds therefor and for the employment of additional inspectors and other necessary expenses incurred by said board, a special tax shall be levied upon all cattle in the several counties of this Territory in the manner and according to the provisions of Section 20 of Chapter 106 of the acts of the twenty-eighth session of the Legislative Assembly of the Territory of New Mexico, which levy shall be within the limit provided for in said section. Upon the order of the Governor, Auditor, and Treasurer, as provided in said section, the county commissioners of the several counties shall cause such levy to be made upon the assessed valuation of all cattle of the bovine species within their respective counties, and shall cause such tax to be collected and paid over to the Territorial Treasurer to the credit of the cattle indemnity fund.

#### NOTICE.

The following notice is published by the Cattle Sanitary Board:

Whenever it shall come to the knowledge of the board that tuberculosis, pleuropneumonia, or any other contagious or infectious cattle disease exists in or may be brought into this Territory from sections north of the fever quarantine line, the Governor will be advised, that he may at once issue his proclamation, as by law provided. (See Section 188, Compiled Laws of 1897.)

## NEW YORK.

The legislation concerning bovine tuberculosis in New York is embodied in the sections quoted below. The work is done under the direction of the State Board of Health. Whenever the board finds the disease in any part of the State they may issue such orders and take such precautions as they may deem necessary or expedient to suppress or prevent its spread; and they may prescribe regulations for the destruction of cattle affected with tuberculosis. The board, before ordering that an animal be killed, shall first have it examined by a veterinarian of the board, and, if desired by the owner, have it appraised. The appraisement of an animal shall be at its sound value, provided that no single unregistered animal shall be appraised at more than \$60. If a slaughtered animal proves to be affected with tuberculosis, the owner is entitled to receive one-half of the appraised value, provided, however, that not more than \$60 shall be paid for a diseased registered animal and not more than \$25 shall be paid for a diseased unregistered animal. If an animal so killed is found not to be affected with tuberculosis, the owner shall be entitled to receive the full appraised value.

No indemnity is allowed to any person who shall wilfully conceal the existence of tuberculosis or who contributes in any way toward its spread; nor shall indemnity be allowed for animals killed unless they have been owned and possessed within the State for at least three months.

The penalty for violation of any order, rule, or regulation of the State Board of Health with reference to tuberculosis in cattle is \$100.

## LAWS.

SECTION 60. The State Board of Health shall investigate concerning the existence and cause of tuberculosis in cattle and the danger to the public health therefrom, and shall use all reasonable means for averting and suppressing such disease. Such board may cause all proper information in its possession respecting tuberculosis in cattle to be sent to the local board of health nearest to the cattle affected, and may add thereto such useful suggestions as to the removal of the sources of danger therefrom or as to the destruction of such cattle as to such board may seem proper. The local health authorities shall supply to the State Board of Health like information and suggestions respecting the existence of tuberculosis in cattle.

SEC. 61. Whenever tuberculosis shall be found among cattle in any part of the State the State Board of Health shall take measures to suppress such disease and prevent the spread thereof, and may order all persons to take such precautions against the spread of such disease as it may deem necessary or expedient. Such board may call upon any peace officer in the neighborhood of such disease to enforce the orders of such board respecting such disease, and to observe and carry out the rules, orders, and instructions which he may receive therefrom. Such board may prescribe regulations for the destruction of cattle affected with tuberculosis, for the proper dispensation of their hides and carcasses and of all objects which might convey the infection or contagion, and for the disinfection of premises, buildings, boats, cars, stables, and other objects or places from or by which such infection

or contagion might be communicated. The State Board of Health may employ such medical aid, veterinary practitioners, and other persons as it may deem necessary to assist in the inspection, isolation, destruction, or disposition of cattle affected with tuberculosis, prescribe rules and regulations for such inspectors and employes, and fix their compensation.

SEC. 62. Whenever the State Board of Health may deem it necessary for the prevention of the spread of tuberculosis in cattle, such board may cause to be killed any animal affected thereby or which, by contact with diseased animals, or by exposure or infection or contagion therefrom, such board may determine is liable to contract or communicate such disease; but no such diseased animal shall be so killed on account of tuberculosis unless first examined by a veterinary practitioner in the employ of the State Board of Health, and, if desired by the owner, appraised, as hereinafter provided. A local board of health shall, pursuant to rules and regulations prescribed by the State Board of Health, cause to be killed, every horse affected with glanders found within its jurisdiction, but no horse shall be so killed on account of glanders until the value thereof be appraised, as hereinafter provided.

SEC. 63. To determine the value of such animal the Comptroller shall designate some competent, disinterested person, residing within the judicial district in which such animal may be, to act as appraiser, with an appraiser to be selected by the owner of such animal, who shall promptly fix a time when they shall view such animal and shall proceed to appraise the value thereof. In case of a disagreement between the two appraisers, the third appraiser shall be selected by them, and the estimate of the value of either two of them shall be final. The animal shall be appraised at its sound value: *Provided, however*, No single unregistered animal shall be appraised at more than \$60, and no horse affected with glanders shall be appraised at more than \$50. Each appraisal shall be in writing, signed by the appraiser or appraisers agreeing, and shall be delivered by them, if the animal be suspected of tuberculosis, to the veterinary practitioner in charge of such animal, and if the animal be a horse affected with glanders, to the secretary of the local board of health having jurisdiction thereof. Upon the delivery of such appraisal, such animal shall be killed, as hereinbefore provided; and if it be killed on account of tuberculosis, the veterinary practitioner in charge thereof shall forthwith make a postmortem examination of the animal, and if it shall be discovered on such postmortem examination that the animal was affected by tuberculosis, the owner of the animal shall be entitled to receive one-half of the appraised value: *Provided, however*, That not more than \$60 shall be paid for a diseased registered animal and not more than \$25 shall be paid for a diseased unregistered animal; but if such examination of the animal killed on account of tuberculosis discloses that the animal was not affected with tuberculosis, the owner shall be entitled to receive the full appraised value. The written appraisal of the value of an animal killed on account of tuberculosis, and a written statement of the result of the postmortem examination thereof, signed by the veterinary practitioner in charge thereof, shall forthwith be transmitted by such veterinary practitioner to the Secretary of the State Board of Health, who shall file the same in his office. The secretary of the local board of health having jurisdiction in the case of a horse affected with glanders shall, in case such horse is killed, upon receipt of the written appraisal, signed by the appraiser or appraisers, as hereinbefore provided, forthwith make and sign a certificate of such fact, and transmit such appraisal and certificate to the Secretary of the State Board of Health, who shall file the same in his office. Upon receipt from the veterinary practitioner, in case of an animal killed on account of tuberculosis, or from the secretary of the local board of health having jurisdiction in the case of a horse killed on account of glanders, such Secretary of the State Board of Health shall forthwith make a written certificate, signed by him, setting forth the name and



post-office address of the owner of the animal killed, and the amount which such owner is entitled to be paid on account of the killing of such animal, and shall forthwith transmit such certificate to the Comptroller, who shall issue his warrant upon the Treasurer for the payment to such person of the amount so certified, and shall mail the same to such person at his postoffice address as it appears by such certificate. No compensation shall be allowed to any person who shall have wilfully concealed the existence of tuberculosis or glanders among his animals or upon his premises, or who, directly or indirectly, by act or wilful neglect, shall have contributed to the spread of such disease or either of them; and no compensation shall be made under the provisions of this act to any owner for animals killed unless the animal or animals killed shall have been actually owned and possessed by the owner thereof within this State for a period of three months prior to such condemnation. The appraisers to be appointed as aforesaid, by the Comptroller, shall hold office during the pleasure of the State Board of Health. Each appraiser so appointed shall receive as compensation the sum of \$5 per day for each day actually employed, and shall also be paid his actual necessary disbursements; but no claim for services or disbursements shall be allowed or paid unless accompanied by a verified detailed statement thereof.

SEC. 64. Any person refusing to obey, or violating an order, rule, or regulation of the State Board of Health respecting tuberculosis in cattle, adopted pursuant to law, shall be liable to a penalty of \$100, recoverable by the State Board of Health, and applicable to the payment of the expenses of such board in carrying out the provisions of this article.

SEC. 65. The State Board of Health may appoint two of its members as a committee, whose particular duties shall be to carry out the provisions of the public health law relating to tuberculosis in cattle, and such members so appointed shall be entitled to receive a salary of \$250 per month and any necessary expenses, and they shall hold office for one year. Such committee shall keep a complete record of all the work done, and submit monthly reports thereof to the State Board of Health.

### NORTH CAROLINA.

AN ACT to repeal Chapter 85, Laws of 1897, and to re-form the Department of Agriculture Immigration, and Statistics. (Ratified March 4, 1899.)

*The General Assembly of North Carolina do enact:*

SECTION 1. That Chapter 85 of the Public Laws of 1897 and all other laws inconsistent with this act be, and the same are hereby, repealed.

\* \* \* \* \*

SEC. 7. The Board [of Agriculture] shall investigate and promote such subjects relating to the improvement of agriculture, the beneficial use of commercial fertilizers and composts, and for the inducement of immigration and capital as they may think proper, but they are especially charged—

\* \* \* \* \*

(2) With investigations adapted to promote the improvement of milch and beef cattle, and especially investigations relating to diseases of cattle and other domestic animals, and shall publish and distribute from time to time information relative to any contagious diseases of stock, and suggest remedies therefor, and shall have power in such cases to quarantine infected animals, to regulate the transportation of stock in this State, or from one section of it to another; and may cooperate with the United States Department of Agriculture in establishing and maintaining cattle districts or quarantine lines, to prevent the infection of cattle from splenic, or Spanish, fever. Any person wilfully violating such regulations shall be guilty of a misdemeanor.

### REGULATIONS.

Under authority of this act, the Board of Agriculture, on December 7, 1899, adopted "regulations for the control of contagious diseases of



live stock." The sections of these regulations which are considered to embrace tuberculosis are as follows:

#### REGULATIONS.

SECTION 8. When the Commissioner of Agriculture shall have good reason to believe, or has received credible information, that a contagious or infectious disease exists among the live stock of this State, or, in case of the nonquarantine territory, that cattle ticks exist on cattle therein, the commissioner shall cause the State Veterinarian or other assistant to investigate said live stock, premises and buildings where the live stock suspected of being diseased or harboring the cattle ticks are kept, and examine said live stock or animals which have come in contact with the aforesaid live stock, for the presence of said suspected disease or cattle ticks.

SEC. 9. Whenever any contagious or infectious disease of live stock shall exist in any portion of the State, or cattle ticks in exempted districts, the infected live stock or infected material which may convey disease, or both, or animals which may have come in contact with such disease, shall be quarantined by the Commissioner of Agriculture on the premises, or in lots or buildings in which they may be found, until such time as danger from the spread of disease is past and all necessary disinfection is completed. The Commissioner of Agriculture is hereby directed to make, publish, and enforce all other rules and regulations temporarily necessary to prevent the spread of contagious and infectious disease in live stock, and cause the disinfection of infected premises by the tenant, owner, or owners, whenever and wherever necessary.

SEC. 10. Whenever any contagious or infectious disease prevails among live stock in any State or Territory of the United States, or any foreign country, live stock from said State or Territory, shall not be admitted to this State except when accompanied by a description or tag, or both, and certificate of absence of disease, or of contact with diseased animals, for thirty days prior to shipment of such live stock, which certificate shall be approved by the State or Territorial Cattle Commissioner, board of health, or veterinarian in charge of the execution of live stock sanitary laws in the State whence the cattle originate, or, in the case of a foreign country, by the Secretary of the United States Department of Agriculture, and be submitted to and acceptable to the Commissioner of Agriculture; said certificate shall be presented before or at the time of the importation of the said live stock into this State.

SEC. 11. The Commissioner of Agriculture shall, upon application of the Superintendent, or authorities, or live stock men of any county, temporarily forbid the entrance of any species of live stock from any infected county or counties until such time as danger of infection from said infected county or counties is past; this local quarantine shall be published in local newspapers, and sufficient notices shall be posted by the Commissioner of Agriculture on the highways at the county line.

SEC. 12. The Commissioner of Agriculture is hereby directed to publish the cattle quarantine laws and these regulations for control of contagious diseases of live stock, together with such maps as may be necessary, and such other information as may pertain thereto, and distribute among the cattlemen of this State.

SEC. 13. These regulations shall be in force on and after January 1, 1900, and supersede those adopted by this board June 2, 1899.

#### INTERSTATE LIVE STOCK TRAFFIC RESOLUTION.

At the meeting of the Board of Agriculture held in Raleigh, March 7, 1900, the following resolution, proposed by the committee on contagious diseases of cattle, was passed without dissent:

Whereas a regulation has already been made by this Board providing that all

cattle shipped here or otherwise introduced from other States, where contagious diseases exist, shall be accompanied by certificates of good health; and

Whereas this regulation has not yet been put in force, and, further, many other States have already taken similar action: Be it

*Resolved*, That the Commissioner of Agriculture shall be instructed at once to take the necessary steps to secure the enforcement of this regulation.

In accordance therewith the following notices are issued:

1. To stock breeders of North Carolina.
2. To all railroad, express, and steamship companies and common carriers doing business in North Carolina; and
3. To live-stock sanitary authorities.

These notices call attention to the enforcement of the regulation in question, and it is expected that all will carry out its spirit and letter.

S. L. PATTERSON, *Commissioner*.

COOPER CURTICE, *Veterinarian*.

NORTH CAROLINA DEPARTMENT OF AGRICULTURE,

*Raleigh, May 1, 1900.*

*To Stock Breeders of North Carolina:*

You are hereby notified that dangerous, destructive, communicable diseases exist in various parts of the United States, to wit: Glanders and farcy in horses and mules, cattle ticks on and tuberculosis in cattle, scab on sheep and other animals, and hog cholera in swine.

Section 10 of the Regulations of the Board of Agriculture, adopted December 7, 1899, to prevent the introduction of such communicable diseases, forbids the admittance into this State of all live stock except when accompanied by a certificate of the live stock sanitary authorities of the State whence the live stock originate, that the said live stock are healthy in every respect.

In purchasing live stock outside the State, inform the breeder of whom you buy that a certificate of health obtained from his live-stock authorities, and bearing the indorsement of this department, must accompany the shipment, in order to avoid trouble, vexatious delays, extra expense, and introduction of disease. The certificate must include a tuberculin examination of cattle for all purposes other than immediate slaughter, or steers for feeding or work.

By careful attention to these points the breeding herds of this State may be kept free from diseases which are now harassing breeders of other States.

Fifteen other States have now legislation to compel the examination of breeding and dairy stock before or at the time of importation.

When breeders design shipping to other States, they should comply with their regulations, and avoid delays and entailed expense upon the arrival of the stock in those States.

Those transferring cattle within the State are especially cautioned about accepting stock that have not been tested. Examinations save much trouble and loss, and guarantee healthy herds, if persevered in.

Refer any question upon sanitary matters to this department.

I am, very respectfully, yours,

S. L. PATTERSON, *Commissioner*.

COOPER CURTICE, *Veterinarian*.

NORTH CAROLINA DEPARTMENT OF AGRICULTURE,

*Raleigh, May 1, 1900.*

*To all railroad, express, and steamship companies and common carriers doing business in North Carolina:*

You are hereby notified that by virtue of the power conferred in the act of General Assembly of North Carolina, entitled "An act to repeal Chapter 85 of the Laws of 1897, and to reform the Department of Agriculture, Immigration, and Statistics," ratified March 4, 1899, which act directs the Board of Agriculture to quar-

antine animals infected with contagious diseases, to regulate the transportation of stock in this State, or from one section of it to another, and to cooperate with the United States Department of Agriculture in establishing and maintaining cattle districts or quarantine lines, to prevent the infection of cattle from splenic, or Spanish, fever, etc., the Board of Agriculture of this State did, on December 7, 1899, make such regulations to take effect January 1, 1900, and supersede regulations adopted by it on June 2, 1899.

By consulting the enclosed regulations and those of the United States Department of Agriculture promulgated at various dates you will note that they are of particular interest to you as common carriers of live stock and as participants in the development of a live-stock industry in this State. The particular orders of the United States Department of Agriculture referred to are its organic law creating the Bureau of Animal Industry, approved May 29, 1884; the recent amendments thereto; B. A. I. Order of April 15, 1887; its amendment dated December 13, 1895, and B. A. I. Orders Nos. 49, 54, 56, and 57.

Your attention is invited to the following points:

1. Under these regulations you can not legally handle any cattle consigned from the quarantined portion of the United States to the counties of this State that have been exempted from quarantine by the United States Secretary of Agriculture.

2. Under Section 7 of the State board regulations you can neither legally deliver nor receive any tick-infested cattle into stock yards of any exempted or any stock-law districts of this State. By carelessness of your agents in this respect the cattle pens west of the Blue Ridge have been closed by the Federal Government, and may be again, thus causing quarantine of all stock in that region. The enforcement of the order in the stock-law region east of the Ridge will hasten the day when it may be relieved from the burdensome restrictions of cattle traffic now placed upon it.

3. Under Section 10 of the board regulations you can not legally deliver live stock shipped into this State unless the animals are accompanied by a certificate of absence of disease, given by the live stock sanitary authorities of the State whence the live stock originates, and approved by this department. Shipping tags bearing the acceptable form of certificate will be supplied to sanitary authorities by this department.

Owing to the presence of communicable diseases in other States, fifteen of these have enacted laws excluding diseased live stock. In order to prevent their shipment into this State the above regulation has become necessary. A few diseased animals introduced into our breeding herds will produce injury from which it will take years to recover. In demanding that the certificate of health shall accompany each shipment, the transportation companies are relieved of attention to the matter further than to see that each shipment bears the certificate, and refuse it without. This method least interferes with traffic when once understood.

Your authority for refusing to ship live stock without certificate is contained in B. A. I. Order, dated December 13, 1895. This prohibits the interstate transportation of animals affected with hog cholera, tuberculosis, or sheep scab, and B. A. I. Order No. 56, dated December 28, 1899, which adds other diseases and live stock, including horses and goats, to the list. Since transportation companies can not act as experts in the detection of diseases in the live stock submitted to them for transportation, they may well insist that such stock be certified by the authorities of the State where accepted.

In assisting in this movement to secure healthy breeding stock for the farms in this State and in preventing the spread of dangerous communicable diseases, you will aid in the upbuilding of the farming industry and add materially to the increased traffic which is dependent upon it.

I am, very respectfully, yours,

S. L. PATTERSON, *Commissioner*.  
COOPER CURTICE, *Veterinarian*.



NORTH CAROLINA DEPARTMENT OF AGRICULTURE,  
*Raleigh, May 1, 1900.*

*To live stock sanitary authorities.*

GENTLEMEN: You are hereby notified that the Board of Agriculture of this State has passed the accompanying regulations, which includes one to prevent the introduction of diseases into this State through the importation of diseased live stock from other States or foreign countries. See Section No. 10. You will please notify your breeders of this action.

The words "live stock" as therein used are synonymous with the word "animals" as used in the Federal regulations. See B. A. I. Order No. 56, page 2. It includes horses, asses and mules, neat cattle, sheep, and other ruminants, and swine.

The word "disease" especially includes any of the following:

Glanders and farcy, distemper, anthrax, Texas, or splenetic, fever, cattle ticks (*Boophilus bovis*), tuberculosis, actinomycosis, variola, foot rot, scab, hog cholera, and swine plague, as specified in said order No. 56, but does not exclude other communicable diseases.

Shipping tags which must accompany shipments into this State will be furnished each Live Stock Sanitary Board or other authority on application. When used they should each be signed by the chief officer of the board or other authority and its veterinarian in the places left for the purpose. Descriptions of the animals must include such data as will serve to identify them, and must be written on the back of the tags.

The certificate which is acceptable is a duplicate of the shipping tag, and must be sent to this department. All practicable known means of determining the absence of disease must be used by the inspector. A sworn copy of the tuberculin test in case of cattle designed for breeding or dairy purposes must accompany the certificate. The tuberculin test should state the amount and manufacturer of the tuberculin used, give the temperatures taken at two hour intervals from the tenth to the eighteenth hour after injection, and other customary data. The test should especially state at what times previous tests had been made and the results. Examinations must be made by men approved by you.

In insisting that the State which you represent presents satisfactory evidence that live stock destined for this State are healthy, this department takes what it believes is the most economical method of dealing with live-stock control for all concerned, and thereby avoids tedious delays and expenses after shipment of such live stock, which delays are incidental upon enforcement of quarantines and inspections en route.

Your State has the necessary means of investigating surroundings and is especially interested in the upbuilding of its live-stock industry and the reputation of the healthfulness of its stock as breeding animals.

This department, in turn, proposes to furnish certificates of health for all live stock exported to such of the States as demand them.

I am, very respectfully, yours,

S. L. PATTERSON, *Commissioner.*  
COOPER CURTICE, *Veterinarian.*

## NORTH DAKOTA.

The law of North Dakota mentions tuberculosis as one of the contagious diseases of domestic animals. The provisions of the law are carried out by a Chief State Veterinarian, assisted by district veterinarians. The duties of the Chief State Veterinarian are to examine into all reports of contagious or infectious diseases in the State; to



instruct district veterinarians as to the treatment of diseased animals; to furnish material for diagnosing contagious diseases; to issue quarantine regulations, after approval by the Governor; to issue rules and regulations, upon approval of the Governor, for carrying out the purposes of this act.

The district veterinarian may order the slaughter of any animal which he believes to be diseased, after notifying the owner of his proposed action. If the owner feels aggrieved at such decision he may demand a consultation of district veterinarians, who shall decide upon the proper action to take.

When it is desired to bring cattle into the State without a certificate of health from a duly authorized veterinarian, owners shall give notice to a district veterinarian. It is made the duty of owners, if they suspect that there are upon their premises animals having a contagious or infectious disease, to report the fact to the district veterinarian, and to confine such animals in a place isolated from all other animals until the arrival of the district veterinarian, who shall have full authority to take possession, treat, and dispose of such animals.

#### LAW.

AN ACT to prevent the spread of contagious, infectious, and epidemic diseases among domestic animals, creating the office of Chief State Veterinarian, prescribing the duties thereof, and appropriating money for the necessary expenses thereof. (Approved March 23, 1895.)

*Be it enacted, etc.:*

SECTION 1. The professor of veterinary science of the State Agricultural College is hereby made Chief State Veterinarian, who shall serve as such without salary, and who shall, upon entering upon his duties, take an oath to well and truly perform all the duties required of him by law, which said oath shall be taken before any judge of a district court, or notary public within the State, and shall be filed with the Secretary of State.

SEC. 2. The State shall be divided into seven "veterinarian districts," in each of which there shall be appointed by the Governor, by and with the consent of the Senate, one competent veterinarian, who shall be known as the "district veterinarian," who shall hold their office for a term of two years from the date of their appointments, respectively, unless sooner removed for cause, and who, upon entering upon their duties, shall each take an oath to well and truly perform their duties as provided by law, which said oath shall be taken before any judge of the district court or notary public within the district of the State for which they may be appointed, and shall be filed with the Secretary of State.

SEC. 3. District No. 1 shall consist of the first judicial district. District No. 2 shall consist of the second judicial district. District No. 3 shall consist of the third judicial district. District No. 4 shall consist of the fourth judicial district. District No. 5 shall consist of the fifth judicial district. District No. 6 shall consist of the sixth judicial district. District No. 7 shall consist of the seventh judicial district.

SEC. 4. The duties of said Chief State Veterinarian shall be to ascertain by personal examination, or through report from the district veterinarian, in such manner as he shall prescribe, all information that he can obtain regarding the existence of any or all contagious, infectious, and epidemic diseases in the State. He shall also make a complete and permanent record of all reports of the district veterinarians; shall make an examination of all diseased animals or portions of any

such that may be forwarded to him by the district veterinarians, and upon completion of such examination shall instruct the district veterinarians in such way as he may deem proper in regard to the treatment of similar cases. It shall also be his duty to furnish material, as far as lies in his power, for the diagnosis of contagious diseases and instructions as to its uses. In case that remedies are discovered for the prevention or cure of contagious diseases, such as glanders, tuberculosis, anthrax, hog cholera, foot-and-mouth disease, and foot rot, it shall be his duty to furnish the district veterinarian, or any person or persons he may see fit to appoint, the remedies so discovered, with full directions for application. He shall also be empowered to make quarantine regulations and enforce the same, after approval and authority by the Governor. He shall further prescribe, with the consent of the Governor, the rules and regulations necessary to carry out the purposes of this act.

SEC. 5. The duties of said "district veterinarians" shall be as follows:

First. To investigate in person any and all cases of contagious, infectious, and epidemic diseases among cattle, horses, mules, sheep, asses, and other domestic animals within his district of which he may have knowledge, and which may be brought to his notice by any resident or any other person in any locality within his said district where such disease may exist; and it shall also be his duty, in the absence of specific information, to make visits of inspection to any locality within his district where he may have reason to believe that there are contagious or infectious diseases existing among such domestic animals.

Second. To seize and inspect in person at the State line bordering on his district any horses, mules, cattle, asses, sheep, or other domestic animals which may be unloaded temporarily or consigned to any point within his district of the State, when the owner, agent, or person in charge thereof shall not upon demand produce certificates of health of such animals satisfactory to him from a duly authorized State or district veterinarian or examiner of the State from which said animals have been shipped.

Third. To examine in person, so often as he may deem reasonable, all pens, inclosures, and cars within the district within which domestic animals may be confined or transported, and to require the owner, agent, or person in charge of all such pens, inclosures, and cars to keep the same in proper sanitary condition.

Fourth. To require in person the owner, agent, or person in charge of all pens, inclosures, or cars within which domestic animals may be confined or transported to cleanse, fumigate, and disinfect all pens, inclosures, or cars within which such domestic animals may be confined or transported, within two days after written notice, when, in his opinion, such cleansing, fumigating, and disinfection shall be necessary for the prevention of the spread or outbreak of any contagious or infectious disease among such animals.

Fifth. It shall also be the duty of the district veterinarian in person to seize and inspect all domestic animals coming into and to remain within his district of the State without a certificate of the health of such animals from a duly authorized State or district veterinarian or examiner from the State from which said animals have been shipped, and before such animals shall be allowed by the district veterinarian to be transported into and to remain within the State. In addition to such inspection, he shall, in person, require from the owner, agent, or person in charge of such animals an affidavit to the effect that such animals have not been exposed to any infectious or contagious disease for a period of at least ninety days prior to the making of such affidavit; and in case that the district veterinarian shall have reason to believe that any domestic animals have been exposed to or have contracted any contagious or infectious disease it shall be his duty to seize and inspect such animals, notwithstanding any certificate of their health by any veterinarian or examiner of any other State, and report the same to the Chief State Veterinarian.

SEC. 6. Whenever any domestic animals are seized and inspected under the provisions of this act by the district veterinarian while such animals are being trans-

ported in cars, on shipboard, or brought into the State in any other manner, the district veterinarian making such seizure and inspection shall require the owner, agent, or person in charge of such animals to pay one-half cent each for the inspection of sheep and twenty-five cents each for all other animals named herein. All money so collected shall be immediately transmitted to the Chief State Veterinarian, together with a detailed report of the seizure and inspection; and it shall be the duty of the Chief State Veterinarian to transmit monthly all money collected as inspection fees under the provisions of this act to the State Treasurer, who shall receipt to the Chief State Veterinarian. All such fees shall be paid by the State Treasurer into the State Treasury general fund: *Provided*, That no inspection shall be made by any district veterinarian of any domestic animals in transit through the State without special instructions from the Chief State Veterinarian where the owner, agent, or person in charge thereof shall produce certificates of the health of such animals from a duly authorized veterinarian or examiner from the State from which said animals have been shipped.

SEC. 7. In all cases of contagious or infectious diseases among domestic animals in this State the district veterinarian shall have authority to order the quarantine of the infected premises and animals within his district, and upon such order to immediately report the same to the Chief State Veterinarian, and in case such disease shall become epidemic in any locality where such epidemic may exist or become known to immediately notify the Chief State Veterinarian, who shall thereupon have authority to enforce a permanent quarantine and prevent the removal therefrom of any animals of the kind among which said epidemic exists until the district veterinarian of such district locality shall report such animals to be in healthy condition, and upon such a report a certificate shall be issued by the Chief State Veterinarian permitting the removal of the animals that are reported to be healthy. The expense of holding and taking care of all animals quarantined under the provisions of this act shall be paid by the owner, agent, or person in charge of the same.

SEC. 8. In case of any epidemic diseases where premises and animals have been previously quarantined by order of the Chief State Veterinarian or by the district veterinarian, as hereinbefore provided, the district veterinarian is further authorized and empowered, when in his judgment it is necessary, to order that any and all diseased animals shall be quarantined at such places and in such a manner as he shall direct, and shall be held in such quarantine until released by certificate of the Chief State Veterinarian, as provided in Section 7 of this act; and in case the district veterinarian shall find that any one or more of the animals so quarantined are so diseased that it becomes necessary to destroy the same to prevent the spread of such disease to other animals, he shall at once serve, in person, a written notice of his intention to destroy upon the owner, agent, or person in charge of the animals so quarantined and condemned; and if such owner, agent, or person in charge of such animals feels aggrieved by the decision of the district veterinarian, and shall desire a consultation of veterinarians, notice in writing to that effect must within twenty-four hours thereafter be served upon the district veterinarian issuing the notice, and it is hereby made the duty of the resident district veterinarian to summon two district veterinarians from adjoining districts to appear and assist in diagnosing and pronouncing upon the character of the disease with which said animal or animals are supposed to be infected; and in case all three district veterinarians, or any two of them, declare said disease to be contagious or infectious in its character, and that such animal or animals should be destroyed to prevent the spread of such disease to other animals, the district veterinarian of the district wherein the animal or animals are located shall immediately slaughter such animal or animals, and not otherwise, and shall then make in duplicate a written statement, setting forth distinctly the nature of the disease for which such animals were condemned and destroyed, to be served on each owner thereof, the original of each order to be filed by the district veterinarian



with the Chief Veterinarian and the duplicate thereof given to the said owner, agent, or person in charge of said condemned animals. It shall be the duty of the owner, agent, or person in charge of any and all animals slaughtered under the provisions of this act to immediately bury the carcass of such slaughtered animals in a trench at least six feet in depth and at least four feet beneath the surface of the ground, or burn and consume such carcasses under the direction of the district veterinarian; and it is hereby made the duty of the district veterinarian, in person, to require the owner, agent, or person in charge of such slaughtered animals within his district to immediately bury or burn under his personal supervision the carcasses of such slaughtered animals, as herein provided, except in all cases where the cause of death is due to anthrax, when they shall immediately be burned.

SEC. 9. Each district veterinarian shall make a report at the end of every three months, and at such other times as may be required, to the Chief State Veterinarian, of all matters connected with his work, the forms of such reports to be furnished by the Chief State Veterinarian; and the Chief State Veterinarian shall transmit to the several boards of county commissioners, as often as he deems necessary, such parts of said reports as may be of general interest to the breeders of live stock, and he shall also give information, in writing, as soon as he obtains it, to the various boards of county commissioners, of each case of suspicion or fresh outbreak of disease in any locality, its causes, and the measures adopted to check it.

SEC. 10. It shall be the duty of any owner, agent, or person in charge of any cattle, horses, mules, asses, sheep, or other domestic animals, where such owner, agent, or person in charge thereof intends to bring any such animals into the State for distribution, sale, transportation, or permanent location therein, without a certificate of their health from a duly authorized veterinarian or examiner of the State from which such animals are shipped, to give notice in writing to the district veterinarian of the district of the State bordering on the State line from which said animals [are] brought at least three days before such animals are brought into this State beyond the quarantine station at the State line of such district; and it shall be the duty of any person or persons who shall have knowledge or suspect that there is upon his or their premises or upon the public domain any case of contagious, infectious, and epidemic disease among domestic animals, to immediately report the same to the district veterinarian of the district wherein such animals or cattle may be, and a failure so to do, or any attempt to conceal the existence of such diseases, or a failure to give notice before passing the quarantine station at the State line of said district, as in this section required, or to wilfully or maliciously obstruct or resist or disobey any order issued by the Chief State Veterinarian or the district veterinarian, or in any way interfere with the discharge of their duties, as set forth in this act, shall be deemed a misdemeanor, and any person or persons who shall be convicted of any one of the above acts or omissions shall be fined not less than \$50 nor more than \$2,000 for each and every such offense: and upon conviction of such offense a second time shall, in addition to the above-named fine, be imprisoned in the county jail of the county wherein convicted, or as otherwise provided by law, for a term of not less than ninety days nor more than one year.

SEC. 11. The following resolutions shall be observed in all cases of disease discovered by this act:

First. It shall be unlawful to sell, give away, or in any manner part with any animal affected with or suspected of being affected with any contagious or infectious disease; and in case of any animal that may be known to have been affected with or exposed to any such disease within one year prior to such disposal, due notice of the fact shall be given in writing to the party receiving the animal.

Second. It shall be unlawful to kill for butcher purposes any such animal; to



sell, give, or use any part of it or its milk, or to remove any part of the skin. A failure to observe these provisions shall be deemed a misdemeanor, and, on conviction, shall be punished by a fine not less than \$100 nor exceeding \$2,000; and, in addition to the above-named fine, be imprisoned in the county jail for a term of not less than ninety days nor more than one year. It shall be the duty of the owner, agent, or person having in charge any animal infected with or suspected of being infected with any contagious or infectious disease, to immediately confine the same in a safe place, isolated from all other animals, and with all necessary restrictions to prevent the dissemination of the disease until the arrival of the district veterinarian within and for the district wherein the same may be at the time. The above regulations shall apply as well to animals in transit through the State as to those resident therein, and the district veterinarian shall have full authority within his district to examine, whether in yard, pasture, or stables, or upon the public domain, all animals passing through the State within his district or any part of it, and on detection or suspicion of disease, take possession of and treat and dispose of such animals in the same manner as is prescribed for animals resident within the State.

SEC. 12. Each of said district veterinarians shall receive for their [his] services the sum of \$600 per annum. The payment of such salary shall be made from any funds in the State Treasury not otherwise appropriated, monthly, upon itemized vouchers, signed and sworn to by each for his separate district and submitted to the State Auditor, who shall draw warrants upon the State Treasurer for the amount thereof, if found correct, separately. No person shall be competent under this act to receive the appointment of district veterinarian who is not at the date of his appointment a graduate in good standing of a recognized college of veterinary surgeons, or who has not practiced veterinary surgery within the State for at least five years. Before entering upon the discharge of his duties he shall give a bond to the State of North Dakota, with a good and sufficient surety, in the sum of \$2,000, conditioned on the proper discharge of the same. No constructive mileage shall be paid under this act, nor shall the district veterinarian receive any mileage except when called in cases of consultation, as hereinbefore provided, when he shall receive actual expenses paid by him.

SEC. 13. The district veterinarians shall select the place or places within their respective districts at which all animals referred to herein shall be quarantined.

SEC. 14. All fines collected under the provisions of this act shall be paid into the general funds of the State.

SEC. 15. It is hereby made the duty of the Attorney-General or State's attorney of the respective counties of the veterinarian district to prosecute any case complained of by the district veterinarian of such district for prosecution in any justice or district court within the jurisdiction of which any violation of this act may have been had, and on conviction of violation of any of the provisions of this act the court, in addition to the penalties prescribed by law, shall add thereto reasonable attorney's fees, as it may be determined just in the premises.

SEC. 16. [Refers to sheep.]

SEC. 17. [Refers to sheep.]

SEC. 18. [Refers to sheep.]

SEC. 19. In addition to the duties of the Chief State Veterinarian hereinbefore described, he shall make an annual report to the Governor on or before the first day of December of all matters connected with his work, and in addition thereto may, from time to time, as in his judgment seems best, publish bulletins for general distribution, giving information as to the existence of animal diseases in the State, and such suggestions thereto as to care and treatment as he thinks proper.

SEC. 20. For the purpose of carrying out the provisions of this act as herein set forth there shall be appropriated, out of any money in the State Treasury not otherwise appropriated, an annual sum of \$3,600 with which to pay the salaries of

the district veterinarians, and the further annual amount of \$500 for stationery, clerk hire, and all traveling and other necessary expenses of the Chief State Veterinarian.

SEC. 21. In case of any serious outbreak of any contagious, infectious, or epidemic diseases among domestic animals which can not be supervised by the district veterinarian, the Chief State Veterinarian shall at once notify the Governor, who shall thereupon appoint a sufficient number of deputies to perform the required duties at such compensation as he may deem proper, not to exceed \$5 per day for the actual time employed, the same to be paid out of the general fund of the State upon vouchers duly approved by the Governor and the Chief State Veterinarian.

SEC. 22. All acts and parts of acts in conflict with the provisions of this act are hereby repealed.

SEC. 23. An emergency exists in that the existing law is inadequate to prevent the spread of contagious and infectious diseases among domestic animals within the State, this act should take effect prior to July 1, 1895: Therefore this act shall take effect and be in force from and after its passage and approval.

### OHIO.

No special legislation with reference to bovine tuberculosis is on the statutes of Ohio, but the Board of Live Stock Commissioners may deal with the disease as one of the "dangerous and fatal diseases among domestic animals."

The board is authorized to use all proper means to prevent the spread and provide for the extirpation of all such diseases. Owners of animals affected with any infectious or contagious disease must immediately report the fact to the board, who shall cause an examination by a veterinarian. If the animals are found to be diseased or to have been exposed to disease, they shall be quarantined. The board must also prescribe such regulations as they may deem necessary to prevent the contagion from spreading.

It is also unlawful to bring into the State or to sell or dispose of any animal known to be affected with a contagious or infectious disease, except under such conditions as the board may prescribe. The penalty for violation is not to exceed \$500.

Whenever the Governor believes that any such disease exists in any locality in another State or Territory, he shall prohibit, by proclamation, the importation of any live stock of the kind diseased into the State, except as may be prescribed by the State Board of Live Stock Commissioners.

There is no provision for indemnity for cattle which may be slaughtered on account of tuberculosis.

### LAW.

(From Bates's Annotated Ohio Statutes, 1897.)

(4211-9) SECTION 1. The Governor shall, with the advice and consent of the Senate, appoint three persons, who shall constitute a Board of Live Stock Commissioners, who shall hold their office in the order in which they are named, the first for one year, the second for two years, the third for three years, and their

successors in office shall be appointed for three years each. They shall meet as soon as practicable after their appointment, and, after taking the oath of office, shall appoint from their number a president and secretary.

(4211-10) SEC. 2. The Board of Commissioners are authorized to use all proper means to prevent the spread of dangerous and fatal diseases among domestic animals, and to provide for the extirpation of such diseases; and in the event of any such contagious or infectious disease breaking out in the State it shall be the duty of all persons owning or having in charge animals infected with the same to immediately notify said Board of Commissioners, or some member thereof, of the existence of such disease; and thereupon it shall be the duty of said board immediately to cause proper examination thereof to be made by a competent veterinarian; and if said disease shall be found to be a dangerously contagious or infectious malady, the board shall order the diseased animals, and such as have been exposed to the contagion, to be strictly quarantined in charge of such person as the board, or an authorized member thereof, shall designate, and to order any premises or farms where such disease exists, or has recently existed, to be put in quarantine, so that no domestic animal subject to such disease may be removed from or brought to the premises or places so quarantined; and the board shall prescribe such regulations as they may deem necessary to prevent the contagion from being communicated in any way from the premises so quarantined.

(4211-11) SEC. 3. The bodies of all dead animals shall be buried or burned by the owners thereof, as provided by law.

(4211-12) SEC. 4. That any person having in his possession or under his care any animal which he knows or has reason to believe is affected with a dangerously contagious or infectious disease, and does not, without unnecessary delay, make known the same to said board, or to some member thereof, or to the sheriff or constable of the proper county, to be by him communicated to said board; or any person or corporation who shall bring into this State, or sell or dispose of any animal, knowing the same to be affected as aforesaid, or any animal having been exposed to such contagion, within three months of such exposure, or shall move the animal so diseased or exposed from the quarantine to which it was ordered by the Board of Commissioners, or shall move any animal to or from any district in this State declared to be infected with such contagious disease, or shall bring into this State any animal of the kind diseased from any district outside of the State that may at any time be legally declared to be affected with such disease, without the consent of said board, except under such conditions as are or may be prescribed by said board, shall, upon conviction of either of the aforesaid offenses, be fined in any sum not exceeding \$500. And all proper expense incurred in the quarantining of animals under the provisions of this act shall be paid by the owners thereof, and if the same is refused, after demand made by order of the commissioners, an action may be brought to recover the same with costs of suit, which action may be brought in the name of the State of Ohio for the use of the Board of Live Stock Commissioners. It shall be the duty of all sheriffs and constables to execute within their several counties all lawful orders of the said commissioners.

(4211-13) SEC. 5. The Board of Commissioners shall keep a record of their acts and investigations of diseases of live stock and report the same to the Governor on the first Monday of November annually, and at such other times as the Governor may order; and such parts of said report as shall be of general interest to breeders of live stock may be transmitted to the Department of Agriculture, to be published with their proceedings. Said board shall receive for their services the sum of \$4 per day and necessary traveling expenses for each day any member is actually engaged in the investigation of reported cases of outbreaks of disease, as herein provided, or in arranging for the quarantine of diseased animals and other duties connected therewith; and when it becomes necessary for said board to employ any veterinarian, sheriff, constable, or such other persons as may be deemed essential



to assist the commissioners in performing their duties, as set forth in this act, they are authorized to fix and certify their compensation, a properly itemized account of which shall be made out and certified by the board, and paid upon the order of the Governor.

(4211-14) SEC. 6. For the purpose of carrying into effect the provisions of this act the sum of \$1,000, or so much thereof as may be necessary, is hereby appropriated out of any funds not otherwise appropriated.

(4211-15) SEC. 7. Whenever the Governor of the State of Ohio shall have good reason to believe that any dangerous, contagious, or infectious disease has become epidemic in certain localities in other States, Territories, or counties [countries], or that there are conditions which render domestic animals of such infected districts liable to convey such disease, he shall, by proclamation, prohibit the importation of any live stock of the kind diseased into the State, except under such regulations as may be prescribed by the State Board of Live Stock Commissioners and approved by the Governor.

### OKLAHOMA TERRITORY.

Oklahoma has no law relative to bovine tuberculosis.

### OREGON.

No special law relating to bovine tuberculosis is on the statutes of Oregon, but the disease may be dealt with under the law concerning "contagious or infectious diseases of a malignant character." The tuberculin test may be applied in accordance with Section 6 of the act below. This law provides that the Governor, Secretary of State, and President of the State Board of Agriculture are constituted a board entitled the "Oregon Domestic Animal Commission." The duty of this commission is "to protect the health of the domestic animals of the State from all contagious or infectious diseases of a malignant character," and it is empowered to establish, maintain, and enforce such quarantine, sanitary, and other regulations as it may deem necessary.

It is the duty of the State Veterinarian (who is appointed by the commission), upon the receipt of information that a contagious or infectious disease exists in any part of the State, to examine the animals reported to be diseased. If he finds the animals to be diseased, he may take prompt measures to prevent the spread of the disease, notifying the commission of his actions. The commission directs further action and prescribes such rules and regulations as in their judgment may be necessary to suppress the disease.

When the commission shall determine that there is danger that the live stock of the State may become affected with a contagious or infectious disease from the live stock of other States or Territories, they shall acquaint the Governor with the facts, and he shall issue a proclamation indicating the boundary of such quarantine and giving the orders, rules, and regulations prescribed by the commission.

If the commission decides that a diseased animal shall be killed, it appraises the value of the animal, taking into consideration its dis-



eased condition. A certificate showing the number and kind of animals killed and the appraised value is filed with the Secretary of State, who issues a warrant upon the Treasurer for the amount. The right to indemnity does not extend to animals brought into the State in a diseased condition or from a State or Territory in which the diseases with which the animal was affected exists, nor to animals brought into the State in violation of the law or of the rules and regulations.

Animals so diseased shall not run at large, and the owner of such animals or his agent shall not sell, ship, drive, trade, or give them away, under penalty of a heavy fine. Such animals are not to be imported into the State.

The Governor may issue a proclamation prohibiting the importation of animals from States or Territories where contagious or infectious diseases exist unless accompanied by a certificate of health.

The commission is authorized to cooperate with the Bureau of Animal Industry in any efforts toward the suppression or extirpation of infectious or contagious diseases.

The general penalty for violation of any of the provisions of this act or of any of the rules and regulations of the commission is a sum not less than \$10 nor more than \$250.

#### LAW.

AN ACT to prevent the spread of contagious animal diseases. (Approved February 25, 1889.)

SECTION 1. *Be it enacted by the Legislative Assembly of the State of Oregon,* That the Governor, Secretary of State, and the President of the State Board of Agriculture are hereby created a board, under the name and style of the "Oregon domestic animal commission." Said commission shall appoint a competent and skilled veterinary surgeon for the State, who shall hold the office for two years or until his successor is appointed.

SEC. 2. Said veterinary surgeon, before he enters upon the duties of his office, shall take and subscribe to the constitutional oath of office and file the same with the Secretary of State.

SEC. 3. [As amended February 21, 1891.] The salary of the State Veterinarian shall be fixed by the commission and shall not exceed \$1,500 a year and his necessary traveling expenses, and the salaries of the commissioners shall be \$250 each per annum.

SEC. 4. [As amended February 21, 1891.] It shall be the duty of the commission to protect the health of the domestic animals of the State from all contagious or infectious diseases of a malignant character, and for this purpose it is hereby authorized and empowered to employ local inspectors in localities where the commission deem it essential for the protection of domestic animals from contagious diseases, and to establish, maintain, and enforce such quarantine, sanitary, and other regulations as it may deem necessary.

SEC. 5. [As amended February 21, 1891.] It shall be the duty of the stock inspector of each county, and of each local inspector, who discovers, suspects, or has reason to believe that any domestic animal or animals in his county or locality is affected with any dangerous contagious disease to immediately report such fact to the State Veterinarian.

SEC. 6. [As amended February 23, 1895.] It shall be the duty of said State Veterinarian, upon receipt of such information from a stock inspector of any county

that any contagious or infectious disease does exist, to immediately examine, or deputize a competent person to examine, all animals reported to be diseased; and if he finds that such animals are infected with a contagious or infectious disease, he shall promptly take such measures as he may deem expedient and necessary to prevent the spread of the disease: he shall also immediately notify the commission of his actions, which shall be subject to the approval of the commission, who shall subsequently instruct him how to proceed and prescribe such rules and regulations as in their judgment the exigencies of the case may require for the effectual suppression and eradication of the disease; and for that purpose the State Veterinarian may list and describe the domestic animals affected with such disease and those which have been exposed thereto and included within the infected district or premises so defined and quarantined with such reasonable certainty as would lead to their identification; and no domestic animal liable to become infected with the disease or capable of communicating the same shall be permitted to enter or leave the district, premises, or grounds quarantined except by the authority of the commission. When, in the opinion of the commission, it shall be necessary to prevent the spread of contagious or infectious diseases among the live stock of the State to destroy animals affected with or which have been exposed to any such disease, it shall be determined what animals shall be killed and appraise the same as hereinafter provided and cause the same to be killed and the carcasses disposed of as in their judgment will best protect the health of domestic animals of the localities. When, in the opinion of the commission, any of the live stock of the State are infected with tuberculosis, the commission shall have the power to instruct and authorize the State Veterinarian to apply to such animals as are suspected as having tuberculosis the "tuberculin" test.

SEC. 7. When, in the opinion of the commission, it becomes necessary to restrict or regulate the traffic of domestic animals coming from other States, Territories, and counties [countries] to this State, they shall establish quarantine stations and prescribe such other rules and regulations as they may deem essential; also, may compel railroad companies that are operating railroads within the State to disinfect cars, yards, or premises and keep all stock cars in a cleanly and healthy condition that are under their control where animals affected with contagious or infectious diseases have been, and by the consent of the Governor can prohibit said companies or individual owners of railroads, steamboats, ships, and all other conveyances from bringing domestic animals into the State contrary to the regulations of the commission.

SEC. 8. When the commission shall have determined the quarantine and other regulations necessary to prevent the spread among domestic animals of any malignant, contagious, or infectious disease found to exist among the live stock of this State, or liable to be brought from other States, Territories, or countries, and given their orders, as hereinbefore provided, prescribing quarantine and other regulations, the Governor shall issue his proclamation, proclaiming the boundary of such quarantine and the orders, rules, and regulations prescribed by the commission, which proclamation may be published by written or printed handbills posted within the boundaries or on the lines of the district, premises, places, or grounds quarantined: *Provided*, That if the commission decide that it is not necessary, by reason of the limited extend [extent] of the district in which such disease exists, that a proclamation should be issued, then none shall be issued; but such commission shall give notice as may to it seem best to make the quarantine established by it effective.

SEC. 9. Whenever the commission shall direct the killing of any domestic animal or animals, it shall be the duty of the commission to appraise the animal or animals condemned, and in fixing the value thereof the commission shall be governed by the value of said animal or animals at the date of appraisement, taking into consideration its diseased condition.

SEC. 10. Whenever any live stock have been appraised and killed by order of the commission, it shall issue to the owner of the stock so killed a certificate showing the number and kind of animals killed and the amount to which the owner is entitled, and the Secretary of State shall draw his warrant on the State Treasurer for the amount therein stated, payable out of any money in the Treasury not otherwise appropriated.

SEC. 11. When any animal or animals are killed under the provisions of this act by order of the commission, the owner thereof shall be paid therefor the appraised value as fixed by the appraisement hereinbefore provided for: *Provided*, The right of indemnity on account of animals killed by order of the commission, under the provisions of this act, shall not extend to the owners of animals which have been brought into the State in a disease [diseased] condition, or from a State, country, Territory, or district in which the disease with which the animal is affected or to which it has been exposed exists, nor shall any animal be paid for by the State which may be brought into the State in violation of any law or quarantine regulations thereof, or the owner of which shall have violated any of the provisions of this act, or disregarded any rule, regulation, or order of this commission. Nor shall any animal be paid for by the State which came into the possession of the owner with claimant's knowledge that such animal was diseased or was suspected of being diseased, or of having been exposed to any contagious or infectious disease.

SEC. 12. Any person who shall have in his possession any domestic animal affected with any contagious or infectious disease, knowing such animal to be so affected, or after having received notice that such animal is so affected who shall permit such animal to run at large, or who shall keep such animal where other domestic animals not affected by or previously exposed to such disease may be exposed to such contagion or infection, or who shall sell, ship, drive, trade, or give away such diseased animal or animals which have been exposed to such contagion or infection, or who shall move or drive any domestic animal in violation of any direction, rule, or regulation, or order establishing and regulating quarantine, shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be fined in any sum not less than \$10 nor more [than] \$250 for each of such diseased or exposed domestic animals which he or they shall permit to run at large or keep, sell, ship, drive, trade, or give away in violation of the provisions of this act: *Provided*, That any owner of any domestic animal which has been affected with or exposed to any contagious or infectious disease may dispose of the same after having obtained from the State Veterinarian a certificate of health for such animal: *Provided, also*, That horses running on the range within this State infected with distemper, lung or mountain fever shall be exempt from the operation of this act.

SEC. 13. Any person who shall knowingly bring into the State any domestic animal which is affected with any contagious or infectious disease, or any animal which has been exposed to any contagious or infectious disease, shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be fined not less than \$10 nor more than \$250.

SEC. 14. Any person who owns or is in possession of live stock which is affected, or which is suspected or reported to be affected, with any contagious or infectious disease, who shall wilfully prevent or refuse to allow the State Veterinarian or Commissioners or other authorized officer or officers to examine such stock, or shall hinder or obstruct the State Veterinarian or other authorized officer or officers in any examination of or in any attempt to examine such stock, shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be fined in any sum not less than \$10 nor more than \$250.

SEC. 15. Any person or persons who shall wilfully violate or evade, or attempt to violate, disregard, or evade any of the provisions of this act, or who shall wil-



fully violate, disregard, or evade any of the rules, regulations, orders, or directions of the Commission establishing and governing quarantine, shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be fined in any sum not less than \$10 nor more than \$250.

SEC. 16. The commission provided for in this act shall have power to employ, at the expense of the State, such persons and purchase such supplies and material as may be necessary to carry into full effect all orders by it given and to pay a reasonable compensation therefor.

SEC. 17. [As amended February 21, 1891.] The commission shall have power to call upon any sheriff, undersheriff, deputy sheriff, constable, or stock inspector of any county to execute their orders, and such officers shall obey the orders of said commission, and the officers performing such duties shall receive compensation therefor as is prescribed by law for like services, and shall be paid therefor in like manner, and any officer may arrest and take before any justice of the peace of the county any person found violating any of the provisions of this act, and such officer shall immediately notify the prosecuting attorney of such arrest, and he shall prosecute the person so offending according to law.

SEC. 18. Whenever the Governor of the State shall have good reason to believe that any dangerous, contagious, or infectious disease has become epizootic in certain localities in other States, Territories, or countries, or that there are conditions which render such domestic animals from such infected districts liable to convey such disease, he shall by proclamation prohibit the importation of any live stock of the kind disease [diseased] into the State, unless accompanied by a certificate of health, given by a duly authorized veterinary surgeon; and all such animals arriving in this State shall be examined immediately upon their arrival by the State Veterinarian, and if in his opinion there is any danger of contagion or infection they shall be placed in close quarantine until such danger of contagion and infection is passed, when they shall be released by order of the Commissioners: *Provided*, That sheep shall be exempt from the operation from [of] this act.

SEC. 19. For the purpose of this act, each member of the commission is hereby authorized and empowered to administer oaths and affirmations.

SEC. 20. This commission is hereby authorized and required to cooperate with any board or commission acting under any present or future act of Congress for the suppression and prevention of contagious or infectious diseases among domestic animals, and the same right of entry, inspection, and condemnation of diseased animals upon private premises is granted to the United States Board of Commissioners as is granted to the commission under this act.

SEC. 21. The commission shall make biennially a detailed report of its doings to the Legislature at its regular business session.

SEC. 22. This act shall take effect immediately upon its passage by the Senate and House and has been approved by the Governor.

### PENNSYLVANIA.

The laws and rules and regulations of Pennsylvania relative to bovine tuberculosis are best presented in the language of Dr. Leonard Pearson, State Veterinarian, and Mr. M. P. Ravenel, in their report to the State Department of Agriculture, and published in part II of the Report of that Department for 1899. Pages 464 to 490, inclusive, of that report are copied below:

The need of controlling this disease [tuberculosis] has been evident for a long time, and in view of this need the law authorizing the Secretary of the State Board of Agriculture to take steps to eradicate contagious pleuropneumonia of



cattle was so drawn as to confer authority upon the same officer to deal, within certain limits, with other diseases, including tuberculosis. This law was passed in the year 1889, and was in force until the law that follows was enacted by the Legislature of 1895 and approved by the Governor on May 21 of that year:

AN ACT To establish the State Live Stock Sanitary Board of Pennsylvania, and to provide for the control and suppression of dangerous, contagious, or infectious diseases of domestic animals. (Approved May 21, 1895.)

SECTION 1. *Be it enacted, etc.,* That a board is hereby established to be known as "The State Live Stock Sanitary Board." This board shall consist of the Governor of the Commonwealth, the Secretary of Agriculture, the State Dairy and Food Commissioner, and the State Veterinarian, who shall be a competent and qualified person, as provided in the act entitled "An act to create a Department of Agriculture and define its duties."

SECTION 2. That it shall be the duty of the State Live Stock Sanitary Board to protect the health of the domestic animals of the State, to determine and employ the most efficient and practical means for the prevention, suppression, control, or eradication of dangerous, contagious, or infectious diseases among the domestic animals, and for these purposes it is hereby authorized and empowered to establish, maintain, enforce, and regulate such quarantine and other measures relating to the movements and care of animals and their products, the disinfection of suspected localities and articles, and the destruction of animals, as it may deem necessary, and to adopt from time to time all such regulations as may be necessary and proper for carrying out the purposes of this act: *Provided, however,* In the case of any slowly contagious diseases, only suspected or diseased animals shall be quarantined.

SECTION 3. That when it shall be deemed necessary to condemn and kill any animal or animals to prevent the further spread of disease, and an agreement can not be made with the owners for the value thereof, three appraisers shall be appointed, one by the owner, one by the commission or its authorized agent, and the third by the two so appointed, who shall, under oath or affirmation, appraise the animal or animals, taking into consideration their actual value and condition at the time of appraisal, and such appraised price shall be paid in the same manner as other expenses under this act are provided for: *Provided,* That under such appraisal not more than \$25 shall be paid for any infected animal of grade or common stock, and not more than \$50 for any infected animal of registered stock, nor more than \$40 for any horse or mule of common or grade stock, and not to exceed 50 per cent of the appraised value of any standard-bred, registered or imported horses.

SECTION 4. That the board or any member thereof, or any of their duly authorized agents, shall at all times have the right to enter any premises, farms, fields, pens, abattoirs, slaughterhouses, buildings, cars, or vessels where any domestic animal is at the time quartered, or wherever the carcass of one may be, for the purpose of examining it in any way that may be deemed necessary to determine whether they are or were the subjects of any contagious or infectious diseases.

SECTION 5. That any person or persons wilfully violating any of the provisions of this act or any regulation of the State Live Stock Sanitary Board, or wilfully interfering with officers appointed under this act, shall be deemed guilty of misdemeanor, and shall, upon conviction, be punished by a fine of not exceeding \$100 or by imprisonment not exceeding one month, or both, at the discretion of the court.

SECTION 6. That the State Live Stock Sanitary Board is hereby empowered to appoint and employ such assistants and agents and to purchase such supplies and materials as may be necessary in carrying out the provisions of this act, and the board and the members thereof are hereby empowered to administer oaths or affirmations to the appraisers appointed under this act, that they may order and conduct such examination into the condition of the live stock of the State in relation to contagious diseases, including the milk supplies of cities, towns, boroughs, and villages, as may seem necessary, and to take proper measures to protect such milk supplies from contamination.

SECTION 7. That all necessary expenses under the provisions of this act shall, after approval in writing by the Governor and the Secretary of Agriculture, be paid by the State Treasurer upon the warrant of the Auditor-General in the manner now provided by law.

SECTION 8. That this act shall take effect June 1, 1895, and all acts or parts of acts inconsistent herewith are hereby repealed.

It will be seen that under this law the State Live Stock Sanitary Board is established and is required and authorized to take such measures as may be necessary

to suppress or eradicate dangerous, contagious, or infectious diseases. It is well that the precise methods to be followed in dealing with tuberculosis are not inflexibly established by enactment of the Legislature, because as knowledge of this subject is acquired and as experience accumulates methods must change. Hence if the State is to have the advantage at all times of the best methods, it is necessary that the executive body should be able to change its plans and rules as improved methods are developed.

The membership of the Pennsylvania State Live Stock Sanitary Board was not completed until January, 1896. Hence its work dates only from that time and the time the law was approved by the Governor.

When it became necessary to formulate a plan for dealing with tuberculosis of cattle, considerable difficulty was encountered and many somewhat conflicting conditions and circumstances had to be taken into consideration. While a larger number of herd owners had at that time succeeded in eradicating tuberculosis from their herds by the voluntary enforcement of well-advised measures, the public work that had been carried out in relation to tuberculosis was by no means promising or satisfactory. In some States the matter had been taken hold of in such an abrupt and radical way that the property rights of herd owners had been interfered with, and much opposition had arisen to all measures directed against tuberculosis. In other States the authorities seemed to be feeling their way; they would isolate or kill a few tubercular cattle here and there apparently without definite plan or object. Such work had some educational value, because attention having once been drawn to tuberculosis and interest aroused in the subject, it was easier to take more effective measures later on.

It was in the beginning realized by the State Live Stock Sanitary Board that tuberculosis was exceedingly prevalent in some parts of the State; that in some counties in which the dairy industry had reached its highest development a considerable proportion of the herds were infected. It was realized, also, that information in regard to tuberculosis had not been available to herd owners for more than a short time, and that many of the statements in regard to the disease that had been made were from a prejudiced standpoint and were misleading. Moreover, it was believed that there was no justification for the expenditure of State funds in the work of suppressing tuberculosis, excepting under some method that promised to give results that would be reasonably permanent.

An arrangement that was desired by a number of herd owners was that the Live Stock Sanitary Board should authorize payment for cattle in the advance stages of tuberculosis, and pay no attention to the other members of the herd or the sanitary conditions under which they were kept. A large number of letters was received in which such assistance was asked. If these requests had been acceded to, a number of animals badly afflicted with tuberculosis would have been destroyed and their owners would have received indemnity for their losses. Nothing would have been done, however, in the way of checking the progress of disease in the herd. The other members of the herd that had been exposed to advanced cases of tuberculosis, and some of which were probably infected, and the bad sanitary conditions, would not have received attention. In the course of a few weeks or months another request would have been received from the same herd owner, asking that another cow should be taken over by the State and paid for. A little later another similar request would be received from the same source, and so on indefinitely. To have adopted this plan would have meant the transformation of a work that was intended to have permanent sanitary value into a free live-stock insurance operation. The individual herd owners would be helped, because the loss occasioned by tuberculosis would have been taken, in part, at least, from their shoulders and placed upon the public treasury. The public, however, would derive little or no benefit from such a plan.

Another plan that suggested itself was to endeavor to examine all of the cattle in the State in the attempt to discover and remove all tubercular animals. This

plan, however, was not considered seriously for several reasons, and particularly on account of the enormous expense that would have been necessary if it had been put into operation. When it is remembered that this method was tried in Massachusetts, a State having about one-fifth the area and about one-fifth as many cattle as Pennsylvania, and that expenditures under it amounted from \$200,000 to \$250,000 per year, and that even with this enormous expenditure only a small part of that State was covered in this systematic way, the difficulties will at once be apparent.

Since it was not possible to systematically examine all of the cattle in the State, why not examine all of the cattle in the districts in which tuberculosis is known to prevail most extensively? If this were done it was thought that the effect would be to cause dissatisfaction, first, among the owners of healthy herds in such districts who did not need or care to have their cattle examined, and, second, among the owners of tubercular herds in other districts who could not have their cattle examined because the resources of the board were being consumed in the examination of the herds in certain restricted localities.

A number of farmers in different parts of Pennsylvania had taken up the matter of tuberculosis and had themselves done what they could to eradicate it from their herds before the State Live Stock Sanitary Board was established, and it was apparent that there were many herd owners who desired to place their herds on a healthy basis if they were given some encouragement or assistance from the State. Experience everywhere had shown that it was very difficult for a State to check the progress of this disease and to obtain permanent results without the earnest cooperation of the herd owners. So many false and misleading statements in regard to tuberculosis had been published that there was in some quarters a widespread apprehension in regard to the true nature and import of this disease. It seemed evident that with a knowledge of the facts on this question many more farmers desire to eradicate this scourge from their herds.

The importance of at once disposing of advanced and udder cases was not lost sight of, but it was deemed important that this should be done in some way that should not discourage the complete eradication of tuberculosis in the herds of which such animals were members. In formulating a plan of operation, an attempt was made to develop one with which the cattle owners would be in thorough accord.

With the above facts and the knowledge of the above conditions in mind, the plan of operation that was adopted by the Live Stock Sanitary Board in 1896 and that has since been developed on that foundation consists in the following: Circulars are distributed in regard to tuberculosis, the nature, character, and importance of the disease; its method of propagation; its results and the methods that may be adopted to combat it. A good deal of the information contained in these circulars has been made use of by various agricultural papers and has thus been given increased publicity. At this time there is a pretty general realization in all parts of Pennsylvania of the leading facts in this matter.

Herd owners who have wished to suppress tuberculosis in their herds have been assisted by the State Live Stock Sanitary Board under a definite plan of cooperation. According to this plan the herd owner is required to fill out and sign an application form and agreement as below:

#### FORM A.

*Request for inspection and tuberculin test of herd at the expense of the State Live Stock Sanitary Board.*

— — — — —, 190—.

*To the State Live Stock Sanitary Board, Harrisburg, Pennsylvania.*

GENTLEMEN: I have reasons to believe that some of my cattle are afflicted with tuberculosis, and I wish to have my entire herd inspected and tested with tuberculin, if such test is deemed necessary by your representative, and the diseased



animals disposed of according to rules and regulations of the State Live Stock Sanitary Board.

I understand that this inspection and test are to be made at the expense of the Commonwealth, and, in consideration thereof, I agree to thereafter observe the precautions and measures and to employ the means recommended by your board to prevent the reintroduction and redevelopment of tuberculosis in my herd.

I certify that, to the best of my knowledge and belief, none of the dairy cows or cattle for breeding purposes in my herd have been brought from another State into Pennsylvania since January 1, 1898, without having been subjected to inspection and tuberculin test, as required by law.

Yours, respectfully,

(Address) \_\_\_\_\_, \_\_\_\_\_, Pa.

My herd includes the following animals: Cows, \_\_\_\_\_; heifers over one year old, \_\_\_\_\_; bulls over one year old, \_\_\_\_\_; steers, \_\_\_\_\_; calves under one year old, \_\_\_\_\_; total, \_\_\_\_\_. The milk from this herd is used by \_\_\_\_\_ for \_\_\_\_\_.

The cattle are \_\_\_\_\_ (state breed and whether registered).

The following are my reasons for believing that some of my cattle are afflicted with tuberculosis: \_\_\_\_\_.

The herd owner is at the same time informed that the inspection will be made only in accordance with the following conditions:

Upon application from owners of tubercular cattle the State Live Stock Sanitary Board will furnish tuberculin and inspections free on condition that the cattle owner will agree to—

1. Assist in the examination.
2. Separate the cattle found to be tubercular from those that are healthy and have them cared for separately until disposed of, as directed by the State Live Stock Sanitary Board.
3. Disinfect the stables and correct faulty sanitary conditions, as directed by the State Live Stock Sanitary Board.
4. Discontinue the use of milk and cream from infected cows, except when boiled or heated to 185° F. and kept at this temperature for five minutes.

Upon application from owners of dairy herds not known to be infected the State Live Stock Sanitary Board will conduct or direct inspections of cattle and cattle stables and yards, and will furnish certificates showing the health of the animals and the sanitary condition of their surroundings: *Provided*, That the applicant will agree to bear the necessary expense of such inspections.

Since it is manifestly impossible for the State Live Stock Sanitary Board to investigate all rumors or unsubstantiated reports of contagious diseases among domestic animals, the State Veterinarian may, if in his opinion there exists a reasonable doubt as to the dangerous, contagious, or infectious character of a reported disease, request the owner or person in charge of the stock, at his own expense, to have an examination made by a competent veterinarian, and furnish a report from such veterinarian to the Secretary of the Board. In case this request is not complied with the Board may decline to consider the case.

After the inspection thus asked for has been made by an inspector selected and paid by the State Live Stock Sanitary Board the cattle that show physical evidence of tuberculosis may be at once appraised and destroyed, the appraisement being made, as required by law, with due regard to the actual value and condition of the animal at time of appraisement. The limit of appraisement for unregistered cattle is \$25 and for registered cattle \$50. Anything that may be obtained from sale of the hide or of the carcass to a fertilizer manufacturer the owner receives in addition to the appraisement. The members of the herd that do not show physical signs of tuberculosis, but react to the tuberculin test, may be disposed of in the same way as the animals that show physical evidence of tuberculosis, or, if the owner prefers to keep them alive under prescribed conditions, he is permitted to do so. If the reacting animals are kept, they must be maintained entirely apart from nonreacting cattle. They must be stabled and pastured separately. The owner is not permitted to sell them, nor is he permitted to dispose of or use their milk without previous sterilization by boiling or by heating to 185° F. for ten minutes. The progeny of such reacting cows must be removed immediately after birth and reared on the milk of healthy cows or on heated milk from reacting cows. In other words, if the owner prefers to keep his reacting animals alive, he is per-



mitted to do so under regulations similar to those that Bang formulated and that have proven so satisfactory and safe in Denmark.

It should interest those who have so strongly advocated the adoption in this country of the Danish method of suppression of tuberculosis to know that this method in its entirety has been offered to the farmers of Pennsylvania for four years and that very few have cared to avail themselves of it. This is not because they do not wish to suppress tuberculosis, because a great many farmers have had their herds examined and have willingly sacrificed their reacting cows and have accepted the indemnity offered by the State, which is considerably less than real value of the animals; and this method has been accepted in preference to the Danish method. The reason for this selection is not hard to find.

When a Pennsylvania farmer discovers that he has tuberculosis in his herd and resolves to get rid of it he wishes the whole thing accomplished and off his mind as soon as possible. He does not care to maintain two herds, one healthy and one reacting, and provide separate stable accommodations and separate pastures for them. He does not care to do this because the proper enforcement of this method means a considerable amount of extra work and because there is no market, or a very restricted market, for milk that has been heated. If butter is made on the farm it is possible to adopt this system with a minimum of trouble and loss; but if the milk is sent to a creamery, the creamery will not care to heat it as is necessary and more than likely would refuse to take it. Hence the herd owner almost invariably concludes that it is best to accept the indemnity offered by the State and eradicate the disease at once.

Perhaps, in view of the extent to which tuberculosis of cattle in Pennsylvania prevails, the plan that has been chosen by the farmers of this State is, after all, the best and most economical. If, however, tuberculosis were from ten to fifteen times as prevalent as it is—that is to say, if it were as prevalent in Pennsylvania as it is in Denmark and in parts of Germany—the plan that is followed in Pennsylvania would not be feasible, because to do the amount of work that is now being done would require from ten to fifteen times as much money or, with funds now available, the work would have to be restricted to from one-fifteenth to one-tenth of its present proportions.

So many applications for herd tests are made that it is not possible to respond to all of them. For this reason each herd owner is required to submit his reasons for believing that his herd is infected with tuberculosis, and an attempt is constantly made to confine the inspections to the herds that are most likely to harbor diseased animals. Where an inspection of a herd is desired merely for the purpose of obtaining information as to its condition and, in the event that it proves to be free from tuberculosis, a certificate of health, the owner is required to pay for the examination. Tuberculin is furnished free of charge by the State Live Stock Sanitary Board for this use. When such a certificate is desired the following form of application is used:

#### FORM B.

*Request for inspection at expense of owner.*

—, 190—.

*To the Live Stock Sanitary Board, Harrisburg, Pennsylvania.*

GENTLEMEN: I wish to obtain from you a certificate showing the health of my herd and the sanitary condition of the surroundings in accordance with your rule providing that such certificate can be granted in cases in which herds are examined under your supervision at the expense of the owners of the cattle. I desire this inspection to include a test with tuberculin.

My herd includes the following animals: Cows, —; heifers over one year old, —; bulls over one year old, —; steers, —; calves under one year old, —; total —. It is located on the premises of — in —, — County, Pa.

The milk from this herd is used by — for —.

I hereby agree to pay to the representative of the Board who makes this inspection his reasonable and just charge for such service.

Yours, respectfully,

(Address) ———, ——— County.

The form of certificate now in use is as follows:

*Certificate of inspection and tuberculin test.*

This is to certify, that the herd of Mr. ———, of ——— post-office, ——— County, Pa., consisting of the following animals: ——— was subjected to a physical examination and to the tuberculin test on the ——— day of ———, 190—, by ——— of ———, acting for the State Live Stock Sanitary Board, and the said animals were found to be free from all evidence of tuberculosis or other transmissible disease, with ——— exception: ———; and further, that the stables and yards in which these animals are kept were in good sanitary condition.  
—————, *State Veterinarian.*

If it should be found in an inspection at the expense of the owner that the herd contains cattle afflicted with tuberculosis. these may be disposed of just as they are when the inspection is made at the expense of the State, if the owner will sign the form of agreement printed below:

FORM C.

—————, ———, 190—.

*To the State Live Stock Sanitary Board, Harrisburg, Pennsylvania.*

GENTLEMEN: I have had my entire herd inspected and tested with tuberculin and have reasons to believe that some of my cattle are affected with tuberculosis.

I have had this inspection and test made at my own expense and now wish to dispose of the diseased animals in accordance with the rules and regulations of the State Live Stock Sanitary Board and to avail myself of the assistance afforded by the Commonwealth in such cases. If such assistance is furnished, I agree to thereafter observe the precautions and measures and to employ the means recommended by your board to prevent the reintroduction and redevelopment of tuberculosis in my herd.

My herd includes the following animals: Cows ———, heifers over one year old ———, bulls over one year old ———, steers ———, calves under one year old ———; total ———. The milk from this herd is use by ——— for ———.

The cattle are ———. (State breed and whether registered.)

The inspection and test were made by ——— of ——— on ———, 190—.

I certify that, to the best of my knowledge and belief, none of the dairy cows or cattle for breeding purposes in my herd have been brought from another State into Pennsylvania since January 1, 1898, without having been subjected to inspection and tuberculin test as required by law.

Yours, respectfully,

(Address) ———, ——— County, Pa.

All of these inspections that have been referred to thus far are voluntary on the part of the owner and are not made excepting upon his application and evidence that there is good reason to believe that the herd is actually infected. The question now arises as to whether this method is sufficiently far reaching; that is, whether it insures the inspection of all herds that should be inspected and the removal of all-tubercular animals that should be removed. While this is an important question, its value is somewhat lessened by the fact that the State Live Stock Sanitary Board is doing all of the work it can do with the funds at its disposal, so if more herds were reported for inspection this would mean that a corresponding number of other herds reported for inspection would have to be kept waiting. As a matter of fact, the method that is now in operation is gradually but surely reaching and clearing up the worst infected and the most dangerous herds in the State. Usually the owners of such herds are led to appeal to the State by two motives: First, through fear that tuberculosis may be distributed by the products of their herd, and, second, through a desire to escape the unceasing losses

caused by the ravages of tuberculosis among their cattle. If these motives are not sufficient to cause an inspection to be applied for, the herd owner is, if his herd is badly infected, usually impelled to seek the aid of the State Live Stock Sanitary Board when he finds that his animals and his dairy products do not find a ready market and that his neighbors frown upon the maintenance of a notoriously tubercular herd in their community.

After the tubercular animals are removed from the herd, it is in all cases required that the premises shall be well disinfected and in accordance with the following rules for disinfection given in Circular No. 2:

#### DIRECTIONS FOR DISINFECTING STABLES.

Disinfection as it is usually practiced is misleading and worthless. Disinfection is carried out for the purpose of destroying disease-producing germs, and to be effectual all of these germs must be destroyed. Disease germs are minute living bodies; they float in the atmosphere, are carried by water, food, manure, and, in fact, by anything that has been in the vicinity of an animal suffering with a contagious disease.

The germs of some diseases are very delicate and, after leaving the body of an afflicted animal, die within a short time, and in these cases it is not possible for them to spread very far. In other diseases, however, the germs are exceedingly resistant organisms; they can endure extreme heat and extreme cold; they can live outside of the body for days or week, in some cases for months, and even years.

Most of the disease-producing germs do not multiply outside of the body, but a few of them do, and these can be propagated, under favorable conditions, almost indefinitely.

Since these organisms are so minute and can be carried about in the air as dust, they may lodge in the smallest and most remote portions of the stable and in places most difficult of access. Hence, it is very evident that the usual so-called disinfection, which consists in scattering a strong-smelling substance about, can not be efficient. When the disinfectant (an agent used to destroy disease-producing germs) is scattered carelessly about on the floor of a stable it may not cover more than but one-hundredth of the area upon which the germs are lodged; so that, in this case, but 1 per cent of the stable is disinfected. Disinfectants can not destroy germs that they do not come in contact with; and if but part of the germs are destroyed and the others are allowed to remain the results of the whole operation will be disappointing.

Rules for disinfection follow:

1. Permit the entrance of a plentiful amount of light. Disease-producing germs are destroyed by the direct rays of the sun within a short time. They are destroyed by less intense light more slowly, but will live for long periods in dark places. So that one of the cheapest and best disinfectants is sunlight. There are numerous other advantages in having plenty of light in a cow stable that is not necessary to mention here.

2. Cleanse the stable thoroughly. It has been stated already that disinfectants do not destroy germs that they do not come in contact with, and in order to permit the disinfectants used subsequently to come in contact with all the surfaces that may harbor disease-producing germs it is necessary that these surfaces should be uncovered by the removal of dirt that has accumulated over them.

The cleansing of the stable includes (a) removal of manure; (b) removal of piles of fodder; (c) sweeping the ceiling, walls, and floor; (d) the removal of rotten woodwork and loose boards, especially of the floor; (e) the removal of dried accumulations about mangers, floors, and drains; (f) scrubbing the mangers, feed boxes, stall, and partitions, which should be done with hot water and strong soap, lye, or washing soda.

3. Apply chemical disinfectants. After the stable has been treated as above recommended, it is ready for the application of chemical disinfectants. These are substances that poison disease-producing germs. Some of them are far more efficient than others. One of the most active is bichloride of mercury or corrosive sublimate. This substance is poisonous and must be used with great care. Before it is applied it must be dissolved in water in the proportion of one part to one thousand. One ounce of corrosive sublimate dissolved in eight gallons of water makes a solution of the right strength. In making the solution the corrosive sublimate should be dissolved in one gallon of hot water and then mixed with enough cold water to make eight gallons. This liquid can be applied with a brush, sprinkling pot, or spray pump, and must be carried into every crevice or recess into which dust can enter.



Another disinfectant that is good, but less efficient than the above, is chloride of lime, of which one pound should be dissolved in three gallons of water and applied in the same way. Carbolic acid mixed with water in the proportion of one to twenty parts, or pint to two and one-half gallons of water is also efficient, and should be applied in the same manner as bichloride of mercury solution.

Sulphate of iron, commonly known as copperas, makes an excellent and cheap disinfectant for floors, gutters, drains, etc. It should be applied as a saturated solution. As much sulphate of iron should be dissolved in the water as possible, and this solution should be applied very freely with a sprinkling can to the places that are to be disinfected with it. It is not poisonous, and when applied in large quantities is a good disinfectant. It is also of great utility in disinfecting mangers, feed boxes, etc., on account of its nonpoisonous properties.

4. Whitewash. Although whitewash is not an active disinfectant, in the usual meaning of this term, it is an excellent purifier, and should in all cases be used in stables after they have been thoroughly cleaned and disinfected with other agents. If chloride of lime is added to whitewash in the proportion of one pound to three gallons of water, the value of this application is greatly increased. It is advisable to whitewash cow stables frequently, at least once in six months, and better once every three months. Hot whitewash for this purpose is better than cold.

5. Allow the stable to remain perfectly empty, if possible, for several weeks. Of course, this can not be done in all cases, but where it is possible it is well to allow a greater opportunity for the death of disease-producing germs that may have escaped the disinfectant applications.

There are some badly constructed stables that it is almost impossible to disinfect, because cisterns, wells, cesspools, foot-cellars, spaces in the walls, floors, etc., can not be reached properly. In these cases it is sometimes necessary to vacate the premises for a long period, or, if they have but little value, burn them down. Where the floor of the stable is made of earth it is well to dig it out to a depth of about six inches and refill the excavation with fresh earth.

The litter, old woodwork, etc., removed from infected stables should be burned.

LEONARD PEARSON, *State Veterinarian*.

After a herd has been inspected, it is reinspected within a year if it is found to be badly infected upon the first inspection, and, if necessary, a third, or even fourth inspection will be made. The precautions and measures that the owner agrees to observe, after the inspection has been made at the expense of the State, are the following:

#### CIRCULAR No. 3.

*Precautions and measures to be observed to prevent the reintroduction and redevelopment of tuberculosis in inspected herds.*

After the herd has been inspected and tested with tuberculin and the tubercular animals disposed of in accordance with the rules and regulations of the State Live Stock Sanitary Board, the premises occupied by the diseased animals must be very thoroughly disinfected in accordance with the directions in Circular No. 2 of this board. It is assumed that cattle passed by the inspector—the cattle that show no physical signs of tuberculosis and do not respond to the tuberculin test—are free from tuberculosis, and if they are protected from all sources of infection they will remain free from this disease.

The three principal ways in which tuberculosis is carried into the body are:

- A. With the air.
- B. With the food or water.
- C. Through the skin or mucous membrane.

All of these sources of infection should be guarded against most carefully, and in order that they may be avoided the following measures are recommended:

1. The cattle should be watched very closely and upon the first indication of tuberculosis the suspected animal should be removed from the herd and placed where its products and the things that have been in its immediate vicinity can not come in contact with healthy animals, and the place occupied by it in the stable should be disinfected.

2. It is well to subject the entire herd to the tuberculin test six to twelve months after the first inspection, and if it should be found that an infected animal or a source of infection had escaped the first infection and disinfection, the condition could in this way be recognized before extensive injury had resulted.

3. Additions to the herd should be purchased subject to one of the following



conditions: (a) A report from a competent veterinarian showing that the animal has been tested with tuberculin and found to be free from tuberculosis a short time before the sale, or (b) full information covering the herd from which the animal is procured. In the latter case, it should be known that the herd has never been infected with tuberculosis, or that its members have been inspected with tuberculin and found free from disease.

Freedom from tuberculosis is indicated, but not proven, by a general thrifty appearance, good flesh, bright coat, and bright eye, temperament, and absence of cough. If animal has been well fed, but is found in an unthrifty condition, it is suspicious. Cattle from unknown sources should not be purchased without a guarantee that they are healthy, and since it is absolutely impossible for anyone, however experienced or wise, to discover a large percentage of cases of tuberculosis without the tuberculin test, notwithstanding the fact that many of them may be in condition which renders them dangerous to their associates, the guarantee of health should be based on accurate and reliable information, as indicated above.

4. The cow stable should be well lighted. Many stables are deficient in this respect, and, as it is a serious matter, it should be remedied. The value of light lies in the fact that it restricts activity of and destroys disease-producing germs, and it exposes dirt. Moreover, cows kept in a dark place usually become unthrifty and do not have such a high degree of resistance to disease as is possessed by those kept in the light. Dark stables are apt to be damp also. Thus it is seen that the value of light is manifold and windows should be abundant.

5. The stables should be kept clean. Manure, litter, and dirt must not be allowed to accumulate, because these collections furnish places for the preservation and growth of disease germs and also serve to contaminate the atmosphere by the odors and gases which they emit.

The stable should be kept dry. The fluid evacuations should be absorbed with dry litter or should be drained into a receptacle outside of the stable. If the walls are damp, measures should be taken to correct the fault, because a damp wall leads to an unwholesome degree of moisture of the atmosphere, furnishes a favorable surface for the preservation and growth of germs, leads to contamination of the air with their products, and favors chilling. Sometimes it is necessary to dig the earth away from the wall outside of the stable, and it may be necessary to build a retaining wall a short distance from the stable wall in order to keep the earth back and allow a space for the free circulation of air. Damp walls are sometimes caused by leaky roofs or too short overhangs.

7. The air in the stable must be kept pure. The observance of all the measures recommended above will greatly influence this factor, but as air is constantly being used by the animals in the stable it is necessary to provide for ample ventilation for a renewal of the supply. The arrangements for ventilating should be so planned that air may be introduced in sufficient quantity, but not as a draft that will come in contact with any animals. This subject is discussed more fully in the *State Veterinarian* for 1896.

8. Cleanse the stable with especial care and whitewash it at least once in six months.

9. Do not feed skim milk from creameries to calves without previous sterilization by boiling. This is essential, for many cases have been recorded, and several have come to the personal experience of the *State Veterinarian*, in which a tuberculous herd supplying milk to a creamery, with a large number of patrons who used the skim milk as food for calves and pigs, caused the development of tuberculosis on a number of farms in the vicinity.

10. Do not purchase or use fodder that has been stored above a stable occupied by tubercular cattle. The germs of tuberculosis float in the air as dust and become mixed with fodder stored within their reach, rendering it dangerous to feed it to cattle.

11. Healthy cattle should not be allowed to drink from a watering trough habitually used by tubercular cattle, nor should they be allowed to associate with them in the pasture or elsewhere.

12. The offspring of tuberculous parents should not be allowed to mix with the herd until they have been tested with tuberculin and free from disease.

13. The bull should be perfectly healthy and should not be patronized if he has been in a tuberculous herd, unless his freedom from tuberculosis has been proven by the application of the tuberculin test.

14. It is not well to allow a consumptive to work about cattle or in the dairy, in any capacity.

LEONARD PEARSON, *State Veterinarian*.

All animals afflicted with advanced or udder tuberculosis are required by the regulations of the State Live Stock Sanitary Board to be placed in quarantine, and the milk from such animals is not permitted to be sold or used. A clause in the Pure Food Law also prohibits the sale of milk from diseased cows and provides a penalty for so doing. After advanced and udder cases of tuberculosis are placed in quarantine, they may be appraised and destroyed at the expense of the State if the owner of the herd has signed an application for the inspection of his entire herd. The appraisal and destruction of these cows may be carried out without waiting for the inspection of the remaining portion of the herd, because such animals are prolific distributors of disease germs and they should be gotten rid of as soon as possible and the premises occupied by them disinfected. If the owner of such animals has not and will not apply for an inspection of his entire herd, the animals of the class described are held in strict quarantine until they are disposed of at the loss of the owner, or until the inspection of the herd is applied for and the accompanying agreement is signed. In appraising such animals their actual value and condition at the time of appraisement must be taken into consideration, and it is usually deemed that they have lost all value excepting for fertilizing purposes, so that the amount of appraisement is nominal.

The only compulsory use of tuberculin in Pennsylvania is in the inspection of dairy cows and cattle for breeding purposes coming from other States. Inspection of these animals is required by the act of May 25, 1897. This act and rules for enforcing it follow:

#### LAW.

AN ACT to protect the health of the animals of the Commonwealth of Pennsylvania. (Approved May 26, 1897.)

SECTION 1. *Be it enacted, etc.,* That the importance of dairy cows and neat cattle for breeding purposes into the Commonwealth of Pennsylvania is hereby prohibited excepting when such cows and neat cattle are accompanied by a certificate from an inspector whose competency and reliability are certified to by the authorities charged with the control of the disease of domestic animals in the State from whence the cattle came, certifying that they have been examined and subjected to the tuberculin test and are free from disease.

SEC. 2. That in lieu of an inspection certificate as above required, the cattle may be detained at suitable stock yards nearest to the State line on the railroad over which they are shipped, and there examined at the expense of the owner, or cattle as above specified from points outside of the State may, under such restrictions as may be provided by the State Live Stock Sanitary Board, be shipped in quarantine to their destination in Pennsylvania, there to remain in quarantine until properly examined at the expense of the owner, and released by the State Live Stock Sanitary Board.

SEC. 3. The State Live Stock Sanitary Board is hereby authorized and empowered to prohibit the importation of domestic animals into the Commonwealth of Pennsylvania, whenever in their judgment such measures may be necessary for the proper protection of the health of the domestic animals of the Commonwealth, and to make and enforce rules and regulations governing such traffic as may from time to time be required.

SEC. 4. That any person, firm, or corporate body violating the provisions of this act shall be deemed guilty of a misdemeanor, and upon conviction shall, in the proper court of the county in which such cattle are sold, offered for sale, delivered to a purchaser, or in which such cattle may be detained in transit, for each offense forfeit and pay a fine of not less than \$50 or more than \$100, or be punished by imprisonment for not less than ten days, and not exceeding thirty days, either or both, at the discretion of the court. Such person, firm, or corporate body shall be liable for full amount of damages that may result from the violation of this act.

SEC. 5. The State Live Stock Sanitary Board is hereby charged with enforcement of this act, and is authorized to see that its provisions are obeyed, and to make, from time to time, such rules and regulations as may be necessary and proper for its enforcement.

SEC. 6. That this act shall go into effect January 1, 1898.

## RULES FOR THE ENFORCEMENT OF THE ACT OF MAY 26, 1897.

Dairy cows and neat cattle for breeding purposes may be brought into Pennsylvania from other States only in accordance with one of the three following provisions:

1. The cattle may be examined and tested with tuberculin in the State from whence they come by an inspector whose competency and reliability are certified to by the authorities charged with the control of the disease of animals in that State. Special blanks for reporting upon such examinations will be furnished by the State Live Stock Sanitary Board upon application. Cattle thus examined, found to be free from disease and brought into Pennsylvania, shall remain in the possession of the person or persons who own them when brought into Pennsylvania until the inspection reports have been approved by a member of the State Live Stock Sanitary Board or by an agent authorized to approve such reports. After such approval the cattle can be disposed of without restriction.

2. Dairy cows and neat cattle for breeding purposes may, if shippers so elect, be examined and tested with tuberculin at suitable stock yards nearest to the State line on the railroad over which they are shipped. Such examinations are to be made by inspectors approved by this board and at the expense of the owner of the cattle.

Cattle so inspected shall be marked with a suitable metal tag or shall be accurately described so that they can be reliably identified, and a report on the examination and test, with directions for identification, shall be submitted without delay to this board.

3. Dairy cows and neat cattle for breeding purposes may be brought into Pennsylvania without previous examination only under the following conditions:

A. Notification to the State Live Stock Sanitary Board that it is proposed to bring certain dairy cows or neat cattle for breeding purposes into this State. Such notice must be accompanied by the number and a full and accurate description of the cattle, the names and addresses of the owner and consignee, the date upon which they are to be brought into the State, the route over which they are to be driven or shipped, and the destination.

A blank form to use in rendering this report will be sent upon application to the State Live Stock Sanitary Board.

B. Such cattle shall remain in strict quarantine during transit and after they have arrived at their destination, until they have been examined and tested with tuberculin by an inspector approved by this board. Under this quarantine it is required that the cattle shall be kept apart from other cattle; that they shall remain in the possession of the person or persons who bring them into this State, and that their milk shall not be sold or used without previous sterilization by boiling.

Dairy cows or neat cattle for breeding purposes brought into Pennsylvania under this provision that are found upon examination or test to be tuberculous shall be strictly isolated and quarantined; their milk can not be used for any purpose whatever without previous sterilization by boiling, and they shall not be moved to other premises excepting for slaughter. No compensation shall be allowed for such cattle.

Approved by the State Live Stock Sanitary Board at Harrisburg, Pa., November 5, 1897.

It will be seen that these tests can be made outside of the State by an inspector approved as regards competency and reliability by the authorities charged with the control of the disease of animals in that State; or, if the owner prefers, the cattle may be detained at suitable stock yards in transit and tested there. Under this regulation about 2,500 cattle are annually tested at the stock yards at Pittsburgh. Or, third, the cattle may be shipped on permit to their destination in Pennsylvania, and there examined with tuberculin by an inspector approved by the Live Stock Sanitary Board of this State, and paid by the owner of the cattle.

The form of permit used is the following:

## STATE LIVE STOCK SANITARY BOARD.

Record Book Number, —.

HARRISBURG, PA., —, 190—.

This will permit Mr. ——— to ship ——— cattle (dairy cows or cattle for breeding purposes) from ——— to ———, Pennsylvania, without examination until arrival at destination. These cattle will remain in quarantine until arrival



at destination and test with tuberculin by ———, who is authorized to release them if found free from disease. This permit will expire ———, 190—, and is not valid until a description of each animal in the lot is written below.

This permit is to be taken up by said inspector and returned to the Secretary of the State Live Stock Sanitary Board.

\_\_\_\_\_,  
State Veterinarian.

The following is to be filled in and signed by the shipper:

Animal (cow, bull, heifer, calf).	Breed.	Age (approximate).	Color and markings.	Ear tag number (if any).
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(Shipper signs here) \_\_\_\_\_,  
(Address) \_\_\_\_\_.

Tuberculin for all of these tests is furnished without charge by the board, but the inspectors are, in all cases, compensated by the shipper or owner of the cattle. This law has been in operation but two years, and under it 35,437 cattle have been examined. A considerable proportion of these have been examined before shipment into Pennsylvania. Of those shipped into Pennsylvania and examined at their destination, 238 were condemned. After two years' experience with this law cattle shippers have been able to gain a good deal of information as to where tuberculosis is a prevalent disease, and such localities are now avoided by them. Therefore, the cattle shipped into Pennsylvania at the present time are more carefully selected than ever before, both as to the locality from which they originate and as to their individuality.

The need for this inspection requirement is indicated by the fact that tuberculosis is most prevalent in those parts of Pennsylvania into which the greatest number of cattle are shipped. The fact that large numbers of animals have been brought into these sections means that there has been much opportunity for contamination, and it is evident from the statistics of inspections made in such localities that a large amount of contamination has actually occurred. The cattle in the cattle-producing districts of Pennsylvania, the localities from which cattle are sent out and few are brought in are comparatively free from tuberculosis. By means of this law it is possible for farmers who have eradicated tuberculosis from their herds to restock with animals they know to be in health.

The danger to which purchasers are exposed where they are without the protection afforded by this law is indicated by the fact that cattle dealers in other States have repeatedly endeavored to purchase from farmers in Pennsylvania animals that have been condemned as tubercular. They said that they could readily take them to States without a law requiring the inspection of coming cattle and there dispose of them. The writer has personal knowledge of a number of herds in an adjoining State that have been freed from tuberculosis by selling the tubercular animals. Members of such herds have many times been prevented from coming into Pennsylvania by the application of this inspection law. Indeed, it is a common and well-known practice of certain breeders to sell tubercular animals that they are afraid to keep in their own herds. Complete evidence to support this statement is available. Several large herds have been sold recently because they were so permeated with tuberculosis that they could no longer be maintained profitably.

The danger of infection from such outside sources was first appreciated by the New England States. At this time, however, the appreciation of the danger is general, and the tuberculin test is required to be applied to cattle imported into



the United States from Europe and Canada, to cattle imported by Canada from Europe and the United States, and is also required by seventeen separate States of this country.

In Europe almost every country has this requirement except Great Britain, where foreign cattle are absolutely excluded, excepting those that are killed on landing docks within six days after arrival.

The field work of the State Live Stock Sanitary Board is under the supervision of the State Veterinarian, and is carried out by him with the aid of veterinary practitioners of the State, who are employed for special work as their services are required. For herd tests veterinarians are compensated at the rate of \$5 per day, and proportionate sums for parts thereof. As this rate of compensation is low, it has in some cases been difficult to secure the services of the best veterinarians. It is, however, a rule to which there are few exceptions that the veterinarians of the State take a patriotic view of the matter, and are willing to give the State the benefit of their best skill. It is thought that there has been advantage in having inspections made by veterinarians residing and practicing in the immediate locality. By engaging the services of such veterinarians in this work they become thoroughly familiar with and are interested in the suppression of tuberculosis in the herds in their community, and if the herd owner has reasons subsequently to fear that something is wrong with his cattle he is able, without going far, to consult an expert who is thoroughly familiar with the conditions surrounding the case. Moreover, after a veterinarian has eradicated tuberculosis from a herd so far as possible, he is likely to be interested in the maintenance of the health of that herd, and will be able to do more for it if near by than would be possible at a greater distance.

Another fact that is believed to have had a favorable influence on the progress of the work directed against tuberculosis in Pennsylvania is the manner in which the postmortem examinations have been made. It has been stated above that nearly all owners of tubercular cattle have desired to accept the indemnity offered by the State and have the cattle destroyed. In some States it has been the practice to ship cattle to be killed to a city abattoir or rendering works, where they might be conveniently examined, and their carcasses used for making fertilizer. The amounts received for carcasses for this purpose are not great and if the animals must be shipped far nearly all of the income is taken up in freight charges. It is possible, however, to effect a small saving where full carloads can be shipped. This system has not been generally followed in Pennsylvania, because it was deemed important to restrict owners of animals in regard to tuberculosis, and to permit them to see postmortem examinations is a most effective way of imparting information in regard to the disease.

The statement has been made so often by persons not familiar with the facts in regard to tuberculosis, but who have not hesitated, nevertheless, to make the most positive statements, that an animal can not be extensively diseased without showing well-marked symptoms. In consequence of this, and as a result also of a most natural belief that an animal that looks well must be well, there were people everywhere who could not be convinced that an apparently sound animal, an animal in good flesh, with a good appetite, and giving a good flow of milk, could be tubercular to a material degree, even though it had responded to tuberculin test and even though other symptoms of tuberculosis could be detected by the discerning veterinarian. Where this view prevails, there is no way to teach the facts that must be impressed, if tuberculosis is to be eradicated by a State, other than to give ocular demonstrations. When a man has seen a herd of tubercular cattle alive and has seen them killed and witnessed the alterations produced by the disease, he is willing to admit that an animal can be tubercular to a dangerous degree without showing symptoms. Of course, this same information can be derived by the examination of animals killed for food. It is not an uncommon

thing in large abattoirs to find animals apparently in the pink of condition containing widespread and extensive lesions of tuberculosis. But this source of information is not generally available.

As a striking proof of the value of the information imparted in the manner just indicated, it may be said that the Live Stock Sanitary Board is applied to for the greatest number of inspections in districts in which the greatest number of demonstrations of this kind have been held. As an illustration of this, there is a community in one of the eastern counties of the State in which there were many farmers who were opposed to any inspection of herds for the purpose of repressing tuberculosis. They did not believe that the disease was prevalent enough to be of economic importance, and some of them claimed that it was of little or no importance from the standpoint of public health. No inspections were applied for in this district until, a few months ago, the owner of a herd of twelve cows had lost three of his animals by death from tuberculosis. He thereupon applied for an inspection of the remaining members of his herd, and much to his surprise all of the animals reacted to the test. It was arranged to have them appraised and killed. The matter excited a great deal of interest in the neighborhood, and as many as two hundred farmers came to see the postmortem examinations. They were so impressed with what they saw that a flood of applications for herd tests came to the Live Stock Sanitary Board from that neighborhood, and, as the inspections could not be made as rapidly as was desired, many cattle owners had their cattle tested at their own expense. This illustrates the fact that has been reiterated in this report, that the farmers of Pennsylvania want healthy herds. The farmer who knows that his herd is infected with tuberculosis and who does not apply to the State for assistance in checking the infection is the exception. Therefore what is needed is to bring the facts in regard to tuberculosis to the attention of cattle owners, and no more effective way of doing this has been devised than to make it possible for them to witness postmortem examinations on tubercular cattle.

Sometimes dairymen do not wish to have their tubercular animals utilized in this public way. They desire the slaughter to be conducted privately. Such requests are always observed. Where many animals are to be destroyed and where the facilities are poor, and especially during severe weather, it is most convenient to ship condemned cattle to a fertilizer establishment. The expense of shipment is in this case taken out of the amount paid for the cattle, and the balance is kept by the owner.

Another result of the recognition of the facts in regard to tuberculosis has been the lessening of the tendency that was so extremely prevalent to exaggerate or minimize the facts in regard to the disease. At one time it was very difficult to find articles or to hear discussions on this disease in which the dangers were not grossly exaggerated or the importance underestimated.

During the period of operation of the State Live Stock Sanitary Board 34,000 cattle have been examined and tested with tuberculin at the expense of the State, and of these 4,800 have been condemned, destroyed, and paid for. The payments amount to \$119,000. The cost of the inspections has been \$20,000, making a total expenditure of \$139,000 in four years. An attempt has always been made to select the most extensively diseased herds for inspection. During the first eighteen months of the work, that is up to June 1, 1897, 9,108 cattle were tested, and of these 1,839 were condemned. The percentage of tuberculosis, therefore, was 20.39. From June 1, 1897, to June 1, 1899, 16,687 cattle were examined and 2,116 were condemned, making the percentage of tuberculosis 12.67. The fact should not be lost sight of in this connection that these figures represent the percentage of infection among the most extensively infected herds in Pennsylvania. Since June, 1899, very few herds were examined where there was not strong reason to believe that they were infected, and, indeed, extensively infected, before the

inspection was made. At present a good many herds are being examined at the expense of their owners, and the tubercular animals are being taken over by the State. (Under the arrangement afforded by Application Form C.)

At least as many herds have been examined by their owners as have been examined by the State, and only a limited portion of the tubercular cattle found in these herds are appraised and paid for by the State. Some of them are no doubt sold to drovers and disposed of to other farmers, where they may have an opportunity to spread disease, and others are sold to butchers and turned into food for man. Still others are destroyed by their owners and no compensation is asked for. It should not be inferred that in these inspections made by private expense anything like as many tubercular cattle are found as in inspections made by the State, because the inspections made privately frequently—indeed, usually—reveal the entire herd to be free from infection.

The applications for herd tests are from two to four times as numerous as the inspections made by the State. Some applications are not accompanied by evidence that tuberculosis exists in the herds; others are accompanied by insufficient evidence. Applications are sifted very carefully, and as many inspections are made as can be paid for, and it is the constant endeavor to select for inspection herds that are most likely to contain diseased animals.

All of this shows that interest in tuberculosis and the desire to eradicate it from herds are developing at a rapid rate in Pennsylvania. This tendency is seen not only in requests for inspection, but also in improvements in stables, increased care in purchasing additions to herds, and by the increase of breeding as opposed to the purchase of dairy cows.

An exact census of tubercular cattle in Pennsylvania has never been made and can never be made. Therefore it is impossible to say how much tuberculosis there was in the State and to compare that amount with the undetermined amount that exists at this time. All evidence on this point must be somewhat indirect and circumstantial. There is, however, conclusive evidence to the effect that tuberculosis is very much less prevalent among the cattle of Pennsylvania than it was when the work of the State Live Stock Sanitary Board started in 1896. For example, nearly all of the worn-out dairy cows from the herds in the vicinity of Philadelphia are shipped to that city for slaughter. These cattle are inspected more or less thoroughly by the city meat inspectors. The inspectors visiting or stationed at the Philadelphia slaughterhouses are impressed by the fact that there is very much less tuberculosis among cows than was the case three or four years ago. The practicing veterinarians of the State are in constant contact with herds and are at all times informed as to the general health of the cattle within their fields of practice. The veterinarians testify almost uniformly that tuberculosis is gradually but surely being repressed in the herds with which they come in contact. In the dairy counties in the northeastern part of the State, where there was at one time considerable tuberculosis, thousands of cattle have been tested during the past two years without finding 1 per cent of tubercular animals. It is in these counties that the Live Stock Sanitary Board has done the greatest amount of work, and 550 tubercular cattle have been removed from them.

The increased desire of herd owners to purchase cows known to be free from tuberculosis is shown by the fact that many breeders of purebred cattle guarantee the animals they sell to be free from tuberculosis as established by tuberculin test. At all of the principal auction sales of cattle of the better class the tuberculin test is required by purchasers. Moreover, many dealers in ordinary dairy cows find it to their advantage to have them tested with tuberculin so that they may be able to guarantee all cattle they sell to be free from disease.

Since it is admitted by all who have carefully studied the subject that tuberculosis can never be eradicated from herds without the cooperation of herd owners and an earnest desire on their part that the disease shall be suppressed, the fact



that the herd owners of Pennsylvania are so earnest in this matter constitutes a most hopeful and encouraging sign, and means that the disease will be suppressed. The question now arises as to whether the plan now employed is the best adapted to the purpose in view. The work that has been and is being done has the effect of not only removing diseased and dangerous animals, but, so far as possible, it insures a permanent result for money expended, and in addition it has an educational value that must be looked upon as of great importance. There can be no doubt as to the urgent sanitary grounds for the removal from herds and from the food supply of all cattle afflicted with advanced or udder tuberculosis. But this work alone would continue indefinitely if action were not taken to prevent the disease so that these particularly dangerously diseased animals would not be continually produced. It is for the purpose of striking at the root of the evil that the other measures described above are designed.

### RHODE ISLAND.

The enforcement of laws for the control of contagious diseases of animals in Rhode Island is in the hands of the State Board of Agriculture. The board has power to appoint one or more persons in each county whose duty it shall be to inquire into the condition of any animal or carcass suspected of being affected with tuberculosis, and they may quarantine any such animal or carcass until inspected by the veterinarian employed by the board.

The commissioner of a county must notify the Secretary of the State Board of Agriculture of any suspected case of disease, who shall fix a day when the appraisers and the veterinary surgeon shall make an inspection; if the animal is found to be diseased, it is appraised and killed. The maximum limit of appraisement for any single ordinary or "scrub" animal is \$50; for any single graded animal, \$75; for any single registered animal, \$100.

The appraisers may quarantine any suspected animals, and one-third of the cost of such quarantine is paid by the State.

The State pays to the owner one-half of the appraised value; but if a postmortem shows the animal not to have been affected with tuberculosis, the animal shall be paid for at its full appraised value. These provisions do not apply if the animal so killed has not been owned within the State for three months prior to its being killed.

A certificate giving a description of each animal brought into the State, the date and place of examination, the preparation of tuberculin used, the same to be signed by a veterinarian, shall be sent to the Secretary of the State Board of Agriculture, who in turn sends it, for purposes of identification, to the commissioner for the county where they are to enter the State. The penalty for violation is not to exceed \$100.

Anyone desiring to import cattle into the State without obtaining the certificate mentioned above shall give written notice to the commissioner for the county where they are to go within forty-eight hours after their arrival in the State; such notification shall contain a list



of the cattle, with full descriptions as to age, sex, etc. The cattle commissioner makes an examination of the cattle, and if found free of tuberculosis the fact is certified upon a permit and the cattle are released. If it is suspected that the cattle are affected with tuberculosis, the importer must make the tuberculin test; if this test confirms the suspicion, the cattle are killed, and the State is exempt from the payment of indemnity. If any animal so slaughtered is found not to be affected with tuberculosis, the State pays the full appraised value as indemnity.

The State Board of Agriculture and its representatives may enter any premises for enforcing the law.

The Governor is empowered to accept the rules and regulations of the Bureau of Animal Industry, and the inspectors of said Bureau shall have the right of inspection, quarantine, and condemnation of animals.

The laws relating to bovine tuberculosis are as follows:

#### LAWS.

AN ACT in amendment of Chapter 507, Chapter 627, Chapter 643, and Chapter 1025 of the Public Laws. (Passed May 19, 1892.)

*It is enacted by the General Assembly as follows:*

\*                      \*                      \*                      \*                      \*                      \*

SEC. 8. The board may appoint one cattle commissioner in each county of the State whose duty it shall be to visit and inquire into the condition of any domestic animal in their respective counties whenever there is reason to suspect that any such animal is affected with tuberculosis or other contagious, infectious, or communicable disease.

SEC. 9. The board may employ veterinary surgeons.

SEC. 10. Whenever any animal shall be suspected by either of the cattle commissioners to be affected with tuberculosis the commissioner of the county where the animal is found shall immediately notify the Secretary of the State Board of Agriculture, who shall promptly fix a day when the appraisers, duly appointed as hereinafter provided, shall visit the suspected animal with the veterinary surgeon; and upon confirmation of the disease, and after appraisement of the value as hereinafter provided, the affected animal shall be killed, and the carcass disposed of in such a manner as will not be detrimental to the public health.

SEC. 11. For the purposes aforesaid the board may appoint some suitable person as appraiser whose duty it shall be to act with one of the cattle commissioners in each county, which two persons shall constitute the board of appraisers for the county. In case of disagreement between the two appraisers the veterinary surgeon shall act as a third appraiser, and the estimate of value of either two of them shall be final: *Provided*, That not more than \$50 shall be allowed for any single native animal, nor more than \$75 for any single grade animal, nor more than \$100 for any single registered animal. And written notice of the amount of the appraisal signed by the board of appraisers shall be immediately given to the owner or claimant of said animal: *And provided further*, That any party aggrieved by any award made under the provisions of this section may appeal therefrom to said board within five days after the receipt of said notice.

SEC. 12. The board of appraisers, by and with the advice of the veterinary surgeon, is hereby authorized to quarantine any animal or animals supposed to be affected with a contagious, infectious, or communicable disease, and one-third of

the cost of such quarantining shall be assumed and paid by the State, except as otherwise provided in Section 21 of this act.

SEC. 13. The State shall pay to the owner of any animal killed under the provisions of Section 10 of this act one-half of its appraised value; but if upon a post-mortem examination it shall be found that the slaughtered animal was not affected with tuberculosis, then the animal so killed shall be paid for at its full appraised value: *Provided*, That the State shall not pay for any diseased animal so killed if the animal has not been in the possession of its present owner three months previous to the day of the slaughter.

SEC. 14. When any person shall be shown to have knowingly brought into this State an animal suffering, or suspected to be suffering, with tuberculosis, or to have concealed the existence of such disease in any animal owned by him, such person shall not be entitled to any compensation for the animal slaughtered under this act, and shall be deemed guilty of a misdemeanor, and upon conviction shall be fined for such offense not exceeding \$100.

SEC. 15. All persons having knowledge or reasons to suspect that any neat cattle or bovine animal has the contagious pleuropneumonia or Texas cattle fever, or that any horse has glanders or farcy, or that any bovine animal or horse has any other highly contagious, infectious, or communicable disease dangerous to public health, shall make report concerning the same by mail or otherwise to the Secretary of the State Board of Agriculture immediately, giving the name of the owner or custodian of the said animal or animals and the place of keeping of the same.

SEC. 16. No person having the care or custody of any animal having any one of the diseases mentioned in the preceding sections shall, knowing the same to have any such disease, sell or exchange, or permit the removal, use, or driving of the same upon any public highway, or the exposure of the same to contact with any other healthy animal of the same kind, except by permission of some member or agent of the State Board of Agriculture. Any person so doing shall be deemed guilty of a misdemeanor, and on being convicted shall be fined not exceeding \$100.

SEC. 17. The State Board of Agriculture, or its duly authorized representatives, having reason to suspect the existence of any of the diseases mentioned in this act upon any grounds or premises, are hereby authorized and empowered to enter upon such grounds or premises for the enforcement of the provisions of this act.

SEC. 18. The Governor is hereby authorized to accept, on behalf of the State, the rules and regulations prepared by the Commissioner of Agriculture under and in pursuance of Section 3 of an act of Congress approved May 29, 1884, entitled "An act for the establishment of a Bureau of Animal Industry, to prevent the exportation of diseased cattle, and to provide means for the suppression and extirpation of pleuropneumonia and other contagious diseases among domestic animals," and to cooperate with the authorities of the United States in [enforcing] the provisions of said act.

SEC. 19. The inspectors of the Bureau of Animal Industry of United States, in cooperation with the State Board of Agriculture, shall have the right of inspection, quarantine, and condemnation of animals affected with any contagious, infectious, or communicable disease, or suspected to be so affected, or that have been exposed to any such disease, and for these purposes are hereby authorized and empowered to enter upon any ground or premises. Said inspectors, in cooperation with the State Board of Agriculture, shall have the power to call on sheriffs, constables, and peace officers to assist them in the discharge of their duties in carrying out the provisions of the act of Congress approved May 29, 1884, establishing the Bureau of Animal Industry; and it is hereby made the duty of sheriffs, constables, and peace officers to assist said inspectors when so requested; and said inspectors shall have the same power and protection as peace officers while engaged in the discharge of their duties.

SEC. 20. The State shall not be liable for any damages or expenses incurred under Sections 18 and 19 of this act.

SEC. 21. Any person or persons who shall wilfully or intentionally interfere with any officer or officers, duly authorized to carry out the provisions of this act, or who shall wilfully or intentionally violate the provisions of the quarantine authorized by Section 13 of this act, shall be deemed guilty of a misdemeanor, and upon conviction, shall be liable to imprisonment not exceeding three months or a fine not exceeding \$100, or both, at the discretion of the court.

SEC. 22. The State Board of Agriculture is hereby authorized to fix the compensation of the cattle commissioners, appraisers, and veterinary surgeons, to prescribe their duties, and to remove them when deemed expedient so to do.

SEC. 23. The Secretary of the State Board of Agriculture shall make a monthly report to the Governor of the obligations of the State Board of Agriculture; and the State Auditor is hereby directed to draw his orders on the general Treasurer for the payment of the same upon vouchers approved by the Governor.

SEC. 24. The sum of \$15,000, or so much thereof as may be authorized, is hereby annually appropriated for the purpose of carrying out the several provisions of this act, including all salaries and expenses created under the authority hereof.

SEC. 25. All prosecutions for offenses against the provisions of this chapter shall be commenced within sixty days after the same shall have been committed and not afterwards.

SEC. 26. Chapter 507, Chapter 627, Chapter 643, and Chapter 1025 of the Public Laws, and all acts and parts of acts inconsistent herewith, are hereby repealed and this act shall take effect immediately upon its passage.

AN ACT in amendment of Chapter 1082 [Chapter 99, General Laws] of the Public Laws, entitled "An act in amendment of Chapter 507, Chapter 627, Chapter 643, and Chapter 1025 of the Public Laws," passed May 25, 1892.

*It is enacted by the General Assembly as follows:*

SECTION 1. Section 8 of Chapter 1082 [Chapter 99, General Laws] of the Public Laws is hereby amended so as to read as follows:

"SEC. 8. The board may appoint one cattle commissioner in each county of the State, whose duty it shall be to visit and inquire into the condition of any domestic animal in their respective counties whenever there is reason to suspect that any such animal, or the carcass of any such animal, is affected with tuberculosis or other contagious, infectious, or communicable disease; and the commissioners in their respective counties are authorized to quarantine any such animal, or the carcass of any such animal, until inspected by the veterinarian employed by the board."

SEC. 2. Section 10 of Chapter 1082 [Chapter 99, General Laws] of the Public Laws is hereby amended so as to read as follows:

"SEC. 10. Whenever any animal shall be suspected by either of the cattle commissioners to be affected with tuberculosis, the commissioner of the county where the animal is found shall immediately notify the Secretary of the State Board of Agriculture, who shall promptly fix a day when the appraisers, duly appointed as hereinafter provided, shall visit the suspected animal with the veterinarian; and upon confirmation of the disease, and after appraisalment of the value as hereinafter provided, the affected animal shall be killed, and the carcass disposed of in such a manner as will not be detrimental to the public health. Anyone having reason to suspect that any horse or other animal is affected with glanders, farcy, or any contagious or communicable disease, shall immediately report the same to the Secretary of the State Board of Agriculture, who shall notify the veterinarian employed by the board, and said veterinarian shall promptly examine the suspected animal, and if it is found to be affected with glanders, farcy, or any contagious or communicable disease, the veterinarian shall cause the said animal to



be killed and the carcass to be disposed of in such manner as shall not be detrimental to the public health."

SEC. 3. This act shall take effect upon and after its passage, and all acts and parts of acts inconsistent herewith are hereby repealed.

AN ACT in amendment of Chapter 99 of the General Laws. (Approved May 15, 1896.)

*It is enacted by the General Assembly as follows:*

SECTION 1. Section 13 of Chapter 99 of the General Laws is hereby amended to read as follows:

"SEC. 13. The State shall pay to the owner of any animal killed under the provisions of Section 10 of this act one-half of its appraised value; but if upon post-mortem examination it shall be found that the slaughtered animal was not affected by tuberculosis, then the animal so killed shall be paid for at its full appraised value: *Provided*, That the State shall not pay for any diseased animal so killed if the animal has not been owned by some person in the State and found in the State three months previous to the day of slaughter."

SEC. 2. All persons, corporations, or companies intending to ship, transport, or to drive cattle into the State must produce a certificate to the effect that the cattle to be shipped, transported, or driven are free from tuberculosis as far as may be determined by physical examination and the tuberculin test. The certificate shall give a description of each animal brought into the State sufficiently accurate for identification, and shall give also the date and place of examination of each animal, the preparation of tuberculin used, the quantity injected, the temperature immediately before inoculation, the temperature at the eleventh hour and every two hours subsequent thereto for at least ten hours or until the reaction is completed. The certificate shall be signed by a veterinarian who is a graduate of a recognized veterinary college, and shall be sent immediately to the Secretary of the State Board of Agriculture, who shall immediately notify a commissioner of the county into which the cattle are to be shipped, transported, or driven, and said commissioner shall examine the cattle to identify them. Failure to comply with the law shall be considered a misdemeanor, punishable by a fine not to exceed \$100.

SEC. 3. Complaints for the violation of the provisions of this chapter shall be made by the Secretary of the State Board of Agriculture, and said Secretary shall be exempt from giving security for costs on any complaint made as aforesaid.

SEC. 4. Section 8 of Chapter 99 of the General Laws is hereby amended to read as follows:

"SEC. 8. The board may appoint one or more commissioners in each county of the State whose duty it shall be to visit and inquire into the condition of any domestic animal in their respective counties whenever there is reason to suspect that any such animal or the carcass of any such animal is affected with tuberculosis or other contagious, infectious, or communicable disease; and the commissioners in their respective counties are authorized to quarantine any such animal, or the carcass of any such animal, until inspected by the veterinarian employed by the board."

SEC. 5. This act shall take effect upon its passage, and all acts and parts of acts inconsistent herewith are hereby repealed.

AN ACT in amendment of and in addition to Chapter 344 of the Public Laws, entitled "An act in amendment of Chapter 99 of the General Laws." (Passed May 4, 1900.)

*It is enacted by the General Assembly as follows:*

SECTION 1. All persons desiring to import cattle into this State or from other States without obtaining the certificate required by Section 2 of Chapter 344 of the Public Laws, shall give written notice to the cattle commissioner of the county into which the cattle are brought within forty-eight hours after the arrival into the State of such cattle, and such notification shall contain a specified list of the



cattle so imported, with a full description of age, sex, and such other particulars as may be necessary for the identification of the said cattle, and the place where they can be found.

SEC. 2. Immediately upon the receipt of such notification the cattle commissioner of the county into which said cattle are imported shall proceed within seventy-two hours to the place designated and make a physical examination of said cattle; and if upon such examination said cattle shall be deemed free from tuberculosis, it shall be so certified by said cattle commissioner upon a permit, and a duplicate thereof to be given to the owner of said cattle, and the cattle shall be released for the use and benefit of the owner.

SEC. 3. If after such examination the cattle commissioner shall be of the opinion that the cattle so examined are afflicted with tuberculosis, he shall require of the importer that the suspected cattle be tested with tuberculin, said test to be applied by a veterinarian of a recognized veterinary college, who shall give to the said commissioner a certificate in writing that such test has been applied, together with a statement of the tuberculin used, quantity injected, temperature of each animal before inoculation, and at the eleventh and every two subsequent hours thereafter, for at least ten hours, or until reaction is complete, and a duplicate thereof shall be given to the owner of said cattle and the original certificate shall be sent by the said commissioner to the Secretary of the State Board of Agriculture. If after such test it shall be proved that such suspected cattle are afflicted with tuberculosis, such diseased cattle shall be immediately slaughtered upon written order of said commissioner, and the State shall not be required to compensate the owner for their loss, and the owner shall pay for testing such cattle with tuberculin; but if such cattle shall be found free from tuberculosis they shall be released for the use and benefit of the owner. If any of such cattle are slaughtered, and upon postmortem examination it shall be found that the slaughtered animal was not afflicted with tuberculosis, then the animal so killed shall be paid for by the State at its full appraised value in accordance with the provisions of Section 11 of Chapter 99 of the General Laws.

SEC. 4. Any person violating any of the provisions of this act shall be deemed guilty of a misdemeanor, and shall be fined not more than \$100.

SEC. 5. This act shall take effect from and after its passage.

## SOUTH CAROLINA.

South Carolina has no law relative to bovine tuberculosis.

## SOUTH DAKOTA.

There is no special law relative to bovine tuberculosis in South Dakota. The law against contagious diseases, which is very brief, is given below:

### LAW.

AN ACT to prevent the spreading of contagious diseases among domestic animals. (Approved March 6, 1895.)

*Be it enacted by the Legislature of the State of South Dakota:*

SECTION 1. Any person who shall hereafter knowingly and wilfully bring or cause to be brought into this State any hogs or other domestic animals infected with contagious disease, or any person who shall knowingly carry or drive or cause to be carried or driven upon any public highway or within the distance of one mile of any such highway in this State, or who shall knowingly and wilfully suffer

or permit any hogs or other domestic animals infected with contagious disease to run at large, shall be fined in any sum not to exceed \$100, and shall be liable in a civil action for all damages occasioned thereby.

SEC. 2. An emergency is hereby declared to exist, and this act shall take effect and be in force from and after its passage and approval.

### TENNESSEE.

Tennessee has no special law relative to tuberculosis. The State Board of Health takes cognizance of tuberculosis as one of the "communicable diseases among domestic animals."

The State Board of Health has general supervision of contagious and infectious diseases, and is empowered to establish quarantine against animals having such diseases, and to make rules and regulations to carry the law into effect. The penalty for violation of the rules and regulations of the quarantine is not less than \$50 or more than \$500, or imprisonment for a period of three months, or both fine and imprisonment.

Local boards of health are required to notify the State Board of Health of the outbreak of any contagious disease or whether the presence of such a disease is suspected, whereupon the State Board shall take measures for the restriction and stamping out of the disease. Neglect to notify the State Board is punishable by fine or imprisonment.

The State Board of Health is empowered to kill animals after appraisement at their value at the time they are killed. The board of appraisement certifies the value to the county in which the animal is killed, and the same becomes a charge against that county.

The importation of animals so diseased, or disposing of such animals within the State, is punishable by a fine not exceeding \$100 or by imprisonment not exceeding three months, or by both fine and imprisonment.

It is further made the duty of owners or agents of animals discovered to be or suspected of being affected with any contagious or infectious disease to report the fact to the local board of health, which will at once have the matter investigated. It may also establish temporary quarantine.

The laws which are applicable to tuberculosis and the regulations which have been issued by the State Board of Health are as follows:

### LAWS.

AN ACT to prevent the spread of communicable diseases among domestic animals in the State of Tennessee. (Passed April 10, 1893.)

SECTION 1. *Be it enacted by the General Assembly of the State of Tennessee,* That upon the nomination of the State Board of Health of a qualified person, resident of the State, and who is a graduate of some regular and established veterinary college and skilled in the art of veterinary science, the Governor shall appoint and commission the same State Veterinary Surgeon, whose term of office shall be for five years from date of appointment, or until his successor shall have

been appointed and duly qualified; said State Veterinary Surgeon to have such annual compensation as may be determined and agreed upon by the said State Board of Health: *Provided*, That the said State Board of Health shall have the power to remove said State Veterinary Surgeon when, in their judgment, the public welfare requires it.

SEC. 2. *Be it further enacted*, That the said State Veterinary Surgeon shall, before entering upon the discharge of his duties, take an oath or affirmation, as provided by law in the case of other State officers, and shall immediately execute a bond to the State of Tennessee in the sum of \$10,000, and with such security as shall be approved by the said State Board of Health, and file the same in the office of the Secretary of State, conditioned for the faithful performance of the duty imposed upon said State Veterinary Surgeon as may be prescribed by said State Board of Health.

SEC. 3. *Be it further enacted*, That the State Board of Health shall have the general supervision of all communicable diseases among domestic animals within, or that may be in transit through, the State, and they are empowered to establish quarantine against any animal or animals thus diseased, or that have been exposed to others thus diseased, whether within or without the State, and may make rules and regulations against the spread and for the suppression of said disease or diseases as in their judgment may seem necessary and proper; and in the enforcement of such rules and regulations said State Board of Health shall have the power to call on any one or more of the peace officers, whose duty it shall be to give all the assistance in their power.

SEC. 4. *Be it further enacted*, That any person who wilfully hinders, obstructs, or otherwise disregards or evades such quarantine as said State Board of Health may declare, or violate any rule or regulation they shall make in attempting to stamp out or restrict the spread of any disease or diseases aforementioned, or who shall resist any peace officer, acting under said Board of Health, shall be guilty of a misdemeanor, and upon conviction shall be fined not less than \$50 nor more than \$500, or imprisonment in the county jail for a period of three months, one or both, at the discretion of the court.

SEC. 5. *Be it further enacted*, That in the event of any communicable disease aforesaid breaking out, or being reasonably suspected to exist in any locality in this State, it shall be the duty of the local health authorities, or persons owning or having any interest whatever in said animals, immediately to notify the said State Board of Health of the fact, when said Board shall institute such measures for the restriction or stamping out of such disease or diseases as they may think necessary. Any person or persons above specified, who shall neglect or refuse to notify said State Board of Health of the existence of any communicable disease as aforementioned, shall be guilty of a misdemeanor, and, upon conviction, shall be fined not more than \$10, or confined in the county jail not exceeding two months, or both, at the discretion of the court.

SEC. 6. *Be it further enacted*, That whenever, in the opinion of the State Board of Health, the public safety demands the destruction of any animal or animals, under the provisions of this act, they shall, before ordering the killing or slaughtering of the same, appoint two competent and disinterested freeholders, who shall be affirmed or sworn before proceeding to act, and they, together with the State Veterinary Surgeon, shall thus constitute a board of appraisement to make a just and true valuation of said animal or animals to be so killed or slaughtered, and in valuing shall consider the health and condition of animal when killed; and after said board of appraisement shall make and deliver a written certificate, setting forth all the essential facts in the case to the lawful owner, who shall present the same for payment to the chairman of the court of the county in which such animal or animals are so killed or slaughtered, and the same shall constitute a county charge, and to be paid as other claims against the county now are.

SEC. 7. *Be it further enacted*, That any person or persons who knowingly shall



import or bring into this State any animal or animals affected with pleuropneumonia, rinderpest, glanders, or other communicable diseases, or who shall sell or trade, or offer for sale or trade, any animal or animals so diseased, shall be guilty of a misdemeanor, and upon conviction shall be punished by a fine of not more than \$100 or imprisonment in the county jail for a period not exceeding three months, or both, in the discretion of the court.

SEC. 8. *Be it further enacted*, That the Governor of the State, with the State Board of Health, may cooperate with the Government of the United States for objects of this act, and the Governor is hereby authorized to receive and receipt for any moneys receivable by this State, under the provisions of any act of Congress which may at any time be in force upon this subject, and to pay the same into the State treasury, to be used according to the act of Congress and the provisions of this act, as nearly as may be.

SEC. 9. *Be it further enacted*, That all laws or parts of laws in conflict with this act be, and the same are hereby, repealed, and that this act take effect from and after its passage, the public welfare requiring it.

AN ACT to amend Chapter 180, Acts of 1893, passed April 10th, 1893, and approved April 10th, 1893, entitled "An act to prevent the spread of communicable diseases among domestic animals in the State of Tennessee," and to provide greater protection to the live stock industry of the State, and to provide penalties for the violation of same. (Passed February 12, 1897.)

SECTION 1. *Be it enacted by the General Assembly of the State of Tennessee*, That it shall be the duty of the owner or person in charge of any domestic animal or animals who discovers, suspects, or has reason to believe that any such animal or animals as aforesaid are affected with any communicable disease to immediately report the fact, belief, or suspicion to the county board of health of the county in which said domestic animal or animals are found.

\* \* \* \* \*

SEC. 3. *Be it further enacted*, That the county board of health of each county, whenever any case or cases of communicable disease among the domestic animals of their county is reported to exist, shall immediately cause the same to be investigated, preferably by a qualified veterinarian, and, should said investigation show a reasonable probability that such animal or animals is affected with a communicable disease, the said county board of health shall immediately establish such temporary quarantine as may be necessary, in their judgment, to prevent the spread of such disease, and they shall without delay report all action taken to the State Board of Health, and the acts of the said county board of health establishing said temporary quarantine shall have the same force and effect as though established by the State Board of Health until such time as the said State Board of Health shall take charge of the case or cases, and county boards of health of those counties which form the north border of the quarantine line, as established by the Federal authorities, shall adopt and enforce such rules and regulations as said State Board of Health may prescribe, having for their object the prevention and restriction of splenic, or Texas, fever, or any communicable disease among domestic animals which may be either threatened or developed in such localities. And all expenses incurred by the county boards of health in carrying out the provisions of this act shall be a county charge and shall be paid in like manner as other expenses of the county now are.

\* \* \* \* \*

SEC. 5. *Be it further enacted*, That any person who owns or is in possession of live stock which is reported, or suspected, to be affected with any communicable disease, or with insects which may produce such diseases, who shall refuse to allow said county board of health, or any one acting under its order, to examine such stock, or who shall hinder or obstruct the said board or its appointee in any examination of, or in any attempt to examine, such stock, shall be deemed guilty



of a misdemeanor, and upon conviction thereof shall be fined in any sum not less than \$50 nor more than \$200.

SEC. 6. *Be it further enacted*, That any person who shall have in his or her possession any domestic animal affected with any communicable disease or fever tick, knowingsuch animal to be affected, whoshall permit such animal or animals to run at large, or whoshall keepsuch animal or animals where other domestic animals not affected by or previously exposed to such communicable disease may be exposed to its contagion or infection, or who shall ship, drive, sell, traffic, or give away such animal or animals which have been exposed to such infection or contagion, or who shall move or drive any domestic animal in violation of any direction, rule, regulation, or order of the said State Board of Health establishing and regulating live stock quarantine, or the restriction or spread of communicable diseases among domestic animals, shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be fined in any amount not less than \$50 nor more than \$100 for each of such exposed or diseased domestic animals which he or she shall permit to run at large, or sell, ship, drive, trade, or give away, in violation of the provisions of this act: *Provided*, That any owner of domestic animals which have been affected with or exposed to any communicable disease may dispose of the same after having obtained from said State Board of Health, or its authorized veterinarian, a certificate of health for such animal or animals.

SEC. 7. *Be it further enacted*, That this act take effect from and after its passage, the public welfare requiring it.

#### PROCLAMATION.

##### OFFICE OF STATE BOARD OF HEALTH,

*Nashville, Tenn., June 1, 1900.*

Whereas it has been ascertained by the State Board of Health of the State of Tennessee that a great many of the dairy and breeding cattle in other States are infected with a dangerous and infectious disease in cattle, known as tuberculosis, and that a great many of said cattle are being shipped into the State of Tennessee for breeding and dairy purposes, it is therefore ordered that from and after June 1, 1900, it shall be unlawful for any cattle to be shipped or transported from any State or Territory into the State of Tennessee for breeding or dairy purposes: *Provided, however*, That shipments may be made from other States into the State of Tennessee of breeding and dairy cattle after said cattle have been tested with tuberculin and found free of tuberculosis, and a permit and a bill of health given by a qualified veterinarian or bacteriologist acting under the orders and directions of the Live Stock Sanitary Board of the respective State or Territory, and the certificate so given by such examiner shall be given in duplicate, the original of which shall be forwarded to the State Board of Health at Nashville, Tennessee, and the duplicate given to the railroad or other transportation company, to be attached to the bill of lading for said cattle; and no railroad or other transportation company shall accept any such cattle or bring or ship any such cattle into the State of Tennessee for breeding or dairy purposes without the certificate and bill of health herein provided for, and no railroad or other transportation company shall accept from their connecting lines any cattle shipped in violation of this provision.

Nothing in this resolution shall be construed as exempting from other cattle quarantine restrictions.

By order of the—

STATE BOARD OF HEALTH OF TENNESSEE,  
J. A. ALBRIGHT, M. D.,

*Secretary and Executive Officer.*

W. H. DUNN, *State Live Stock Commissioner.*

## TEXAS.

The official control of contagious diseases of animals in Texas is lodged in a Live Stock Sanitary Commission, composed of three members who are practical stock raisers and appointed by the Governor of the State. The duty of the commission is "to protect the domestic animals of this State from all contagious or infectious diseases of a malignant character, whether such diseases exist in Texas or elsewhere; and for this purpose they are hereby authorized and empowered to establish, maintain, and enforce such quarantine lines and sanitary rules and regulations as they may deem necessary." Tuberculosis is not specifically mentioned.

The laws (R. S., 1895) bearing upon contagious diseases are given below, and the rules and regulations issued are embodied in the proclamations by the Governor.

## LAW.

## [TITLE 102—STOCK LAW. CHAPTER 7.]

ARTICLE 5043a. There shall be appointed by the Governor, and with the consent of the Senate, a Live Stock Sanitary Commission of the State of Texas, composed of three members. Before entering upon the duties of their office said commissioners shall take and subscribe to the usual oath of office and file the same with the Secretary of State; and they shall also, before entering upon the performance of their duties, execute a bond, to be approved by the State Comptroller, in the sum of \$10,000 each, conditioned that they will faithfully perform the duties of their office, which said bond they shall file with the Secretary of State. The term of office of said commissioners shall be for a period of two years next from the day of their qualification and until their successors shall have been appointed and qualified.

ART. 5043b. The commissioners whose appointment is provided for in the preceding article shall each be practical live-stock raisers in the State of Texas, and shall have been actively engaged in said business for at least five years next preceding the date of their appointment, and shall be bona fide residents of and stock raisers in the particular section of the State from which they may be appointed. One of said commissioners shall be appointed from the west, one from the south, and one from the eastern portion of said State.

ART. 5043c. It shall be the duty of the commission provided for in article 5043a to protect the domestic animals of this State from all contagious or infectious diseases of a malignant character, whether said diseases exist in Texas or elsewhere; and for this purpose they are hereby authorized and empowered to establish, maintain, and enforce such quarantine lines and sanitary rules and regulations as they may deem necessary. It shall also be the duty of said commission to cooperate with live stock quarantine commissioners and officers of other States and Territories, and with the United States Secretary of Agriculture, in establishing such interstate quarantine lines, rules, and regulations as shall best protect the live-stock industry of this State against Texas, or splenetic, fever. It shall be the duty of said commission, upon receipt by them of reliable information of the existence among the domestic animals of the State of any malignant disease, to go at once to the place where any such disease is alleged to exist and make a careful examination of the animals believed to be affected with any such disease and ascertain if possible what, if any, disease exists among the live stock reported to be affected,

and whether the same is contagious or infectious, and if said disease is found to be of a malignant, contagious, or infectious character, they shall direct and enforce such quarantine lines and sanitary regulations as are necessary to prevent the spread of any such disease. And no domestic animal infected with disease, or capable of communicating the same, shall be permitted to enter or leave the district, premises, or grounds so quarantined, except by authority of the commissioners. The said commission shall also, from time to time, give and enforce such directions and prescribe such rules and regulations as to separating, feeding, and caring for such diseased and exposed animals as they shall deem necessary to prevent the animals so affected with such disease from coming in contact with other animals not so affected. And the said commissioners are hereby authorized and empowered to enter upon any grounds or premises to carry out the provisions of this act.

ART. 5043*d*. When the commission shall have determined the quarantine lines and other regulations necessary to prevent the spread among domestic animals of Texas of any malignant, contagious, or infectious disease found to exist among the live stock of this State or elsewhere, and given their orders as hereinbefore provided, prescribing quarantine and other regulations, they shall notify the Governor of the State of Texas, who shall issue his proclamation proclaiming the boundary of such quarantine around such diseased stock and the orders, rules, and regulations prescribed by the commission; and such commission shall give such notice as may to them seem best to make the quarantine established by them effective.

ART. 5043*c*. The commission provided for in this chapter shall have power to purchase such supplies and material as may be necessary to carry into full effect all orders by them given as hereinbefore provided, which said supplies and material and wages and expenses of the veterinarian hereinafter provided for shall be paid out of the moneys hereinafter appropriated, on the warrant of the comptroller, issued to said commissioners upon their filing with the comptroller an itemized account thereof properly verified by affidavit: *Provided*, That no material or supplies may be purchased by the commissioners except such as may be necessary to carry into effect the quarantine and other regulations prescribed by them. And such commissioners shall have the power to employ a competent veterinarian to assist them in the investigation of the diseases among the live stock of this State whenever they may deem the services of one necessary: *Provided*, That the compensation of such veterinarian shall not exceed the sum of \$10 per day and actual expenses while so employed: *And provided further*, That the expenditures for the compensation of veterinarians shall not exceed \$900 in any one year.

ART. 5043*f*. It shall be the duty of the railway corporations doing business in the State to cleanse and disinfect the cars used by them in transporting live stock in or through this State at such times and places as the commissioners may designate, whenever, in the opinion of the commissioners, any such order may be necessary to prevent the spread of infectious or contagious disease. And such corporations violating the provisions of this article shall be liable to a penalty of \$500 for each offense, to be recovered in a civil action to be prosecuted under the direction of the Attorney-General in the name of the State of Texas.

ART. 5043*g*. It shall be the duty of any owner or person in charge of any domestic animal or animals who discovers, suspects, or has reason to believe that any of his domestic animals or domestic animals in his charge are affected with any contagious or infectious disease to immediately report such fact, belief, or suspicion to the commission and to the sheriff and county clerk of the county in which said domestic animals are found.

ART. 5043*h*. The commissioners appointed by the Governor, as hereinbefore provided, shall receive \$5 per day for the time by them necessarily employed in the discharge of the duties required by this chapter; and said commissioners herein-



before provided for shall receive in addition thereto the actual and necessary traveling expenses incurred by them and paid in the discharge of the duties required of them by this provision of this chapter, which said per diem and expenses shall be drawn from the treasury on the warrant of the Comptroller, to be issued to said commissioners on their filing with the Comptroller an itemized account thereof properly verified by affidavit.

ART. 5043i. The Live Stock Sanitary Commission shall have power to call upon any sheriff, deputy sheriff, or constable to execute their orders, and such officers shall obey the orders of said commissioners; and the officer or officers performing these duties shall each be entitled to \$2.50 per day for himself and horse, which payment shall be made upon a sworn account, approved by said commissioners: *Provided*, Said expenses under this article shall not exceed in any event \$500 per annum.

ART. 5043j. The sum of \$20,000, or so much thereof as may be necessary, is hereby appropriated, out of the general revenue fund not otherwise appropriated, for the purpose of carrying into effect the provisions of this chapter: *Provided*, That the exhaustion of the appropriation herein made shall terminate the liability of the State for the two years next following and absolve it from any future claims of any and all persons who may have claims, real or pretended, under the provisions of this chapter.

(Amended January 28, 1897.)

ART. 5043k. SECTION 1. *Be it enacted by the Legislature of the State of Texas, That* ARTICLE 5043k be, and the same is, amended so as hereafter to read as follows: Any quarantine line that may be fixed by the Live Stock Sanitary Commission against Texas or splenic fever shall be so fixed as to conform to the Federal quarantine line established or that may be established by the United States Department of Agriculture.

SEC. 2. The fact that there is serious question of the power of the Live Stock Sanitary Commission to establish a quarantine line in conformity with the line established by the United States Department of Agriculture, and, unless such line is established, the entire State may be quarantined by the United States authorities and incalculable injury done to the cattle interests of Texas, creates an imperative public necessity, and an emergency exists that the constitutional rule requiring all bills to be read on three several days be suspended, and that this bill be put on the third reading and final passage, and that the act take effect and be in force from and after its passage, and it is so enacted.

ART. 5043l. No quarantine line shall be established at any time, nor regulations made in regulation thereto, unless two of the Live Stock Sanitary Commissioners agree thereto.

ART. 5043m. This chapter does not repeal any law in force for the protection of domestic animals, but is cumulative thereto.

#### PROCLAMATIONS.

Whereas The Live Stock Sanitary Commission of the State of Texas on December 14, 1899, adopted the following rule and regulation:

First. Whereas The Live Stock Sanitary Commission of the State of Texas have ascertained that a great many of the breeding and dairy cattle in the States of Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Delaware, Pennsylvania, Ohio, Kentucky, Tennessee, Indiana, Michigan, Illinois, Wisconsin, Minnesota, Iowa, Nebraska, and Colorado are infected with a contagious and infectious disease in cattle known as tuberculosis, and that a great many of said cattle are being shipped into the State of Texas for breeding and dairy purposes:



It is therefore ordered that from this date it shall be unlawful for any cattle to be shipped or transported from either of the above-named States into the State of Texas for breeding or dairy purposes: *Provided, however,* That shipments may be made from such States into the State of Texas for breeding and dairy purposes after said cattle have been examined and found free of tuberculosis, and a permit and bill of health given by a veterinarian of the United States Bureau of Animal Industry, or a veterinarian acting under the order and direction of the Live Stock Sanitary Board of either of the above-named States, and the certificates so given by such veterinarians shall be given in duplicate, the original of which shall be forwarded to W. B. Tullis, Quanah, Texas, and the duplicate given to the railroad company to be attached to the bill of lading for said cattle. And no railroad company shall accept any such cattle, nor bring nor ship any such cattle into the State of Texas from either of the above-named States, for breeding or dairy purposes, without the certificate and bill of health herein provided for; and no railroad company shall accept from its connecting lines any cattle shipped in violation of this provision.

Second. *Provided, however,* That native cattle, that is, cattle born and raised in the States of Nebraska and Colorado, may be moved into the State of Texas upon the owner or person in charge thereof making affidavit, supported by the affidavit of two credible disinterested citizens of said State, stating in substance that said cattle are natives of said States of Colorado and Nebraska, which said affidavit shall be made before some officer authorized to administer oaths; and the above affidavit so made shall be given in duplicate, the original of which shall be forwarded to W. B. Tullis, Quanah, Texas, and the duplicate given to the owner or person in charge of said cattle, to be attached to the bill of lading for said cattle; and no railroad company shall accept any such cattle for shipment nor bring nor ship any such cattle into the State of Texas, for breeding or dairy purposes, from the said States of Nebraska or Colorado, nor accept from its connecting lines any cattle shipped in violation of this provision.

Third. It is further ordered that a violation of any of the provisions hereinabove set out shall be an offense and punishable as is provided by the laws of the State of Texas.

Now, therefore, I, Joseph D. Sayers, Governor of the State of Texas, in conformity with the provisions of Chapter 7, Title 102, of the Revised Statutes of Texas of 1895, do hereby declare that the rule and regulation set forth in the above-recited order of the Live Stock and Sanitary Commission of Texas shall be in full force and effect from and after the first day of January, A. D. 1900.

In witness whereof, I have hereunto set my hand and caused the seal of the State to be affixed at Austin, this 28th day of December, A. D. 1899.

JOSEPH D. SAYERS, *Governor.*

By the Governor:

D. H. HARDY,

*Secretary of State.*

Whereas the Live Stock Sanitary Commission of the State of Texas, on October 18, 1900, recommended the adoption of the following regulations:

\* \* \* \* \*

Twelfth. And whereas it has been ascertained by the Live Stock Sanitary Commission of the State of Texas that a great many of the dairy and breeding cattle in the States of Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Delaware, Pennsylvania, Ohio, Kentucky, Tennessee, Indiana, Michigan, Illinois, Wisconsin, Minnesota, Iowa, Nebraska,

Missouri, and Colorado are infected with a dangerous and infectious disease in cattle, known as tuberculosis, and that a great many of said cattle are being shipped into the State of Texas for breeding and dairy purposes; it is therefore ordered that from this date it shall be unlawful for any cattle to be shipped or transported from either of the above-named States to the State of Texas for breeding or dairy purposes: *Provided, however*, That shipment may be made from said States into the State of Texas of breeding and dairy cattle after said cattle, and the herd from which they originated, have been examined and found free of tuberculosis, and a permit and a bill of health given by a veterinarian of the United States Bureau of Animal Industry, or a veterinarian under the order and direction of the Live Stock Sanitary Board of either of the above-named States, and the certificate so given by such veterinarian shall be given in duplicate, the original of which shall be forwarded to M. M. Hankins, Quanah, Tex., and the duplicate given to the railroad company to be attached to the bill of lading for said cattle; and no railroad shall accept any such cattle nor bring or ship any such cattle into the State of Texas from either of said States for breeding or dairy purposes without the certificate and bill of health herein provided for; and no railroad company shall accept from its connecting lines any cattle shipped in violation of this provision: *Provided, however*, That native cattle—that is, cattle born and raised in the States of Nebraska and Colorado—may be moved into the State of Texas upon the owner or the person in charge thereof making affidavit, supported by the affidavit of two credible, disinterested citizens of said State, stating, in substance, that said cattle are natives of said State of Colorado or Nebraska, as the case may be, which said affidavit shall be made before some officer authorized to administer oaths; and the above affidavit so made shall be given in duplicate, the original of which shall be forwarded to M. M. Hankins, Quanah, Tex., and the duplicate given to the owner or person in charge of said cattle, to be attached to the bill of lading for said cattle; and no railroad company shall accept such cattle for shipment, nor bring nor ship any such cattle into the State of Texas, for breeding or dairy purposes, from the State of Colorado or Nebraska, nor accept from its connecting lines any cattle shipped in violation of this provision: *And provided further*, That cattle may be shipped into Texas for show or exhibit at public fairs, or for immediate slaughter or export from Texas ports, without such certificate; but if such show cattle are sold in Texas, then before being delivered to purchasers they shall be tested as herein stated.

\* \* \* \* \*

Seventeenth. It is further ordered that a violation of any or either of the above rules and regulations shall be an offense, and punishable as is provided by the laws of the State of Texas.

Now, therefore, I, J. N. Browning, Lieutenant-Governor and Acting Governor of the State of Texas, in conformity with the provisions of Chapter 7, Title 102, of the Revised Statutes of Texas of 1895, do hereby declare that the quarantine line and the rules and regulations set forth in the above-recited order of the Live Stock and Sanitary Commission of the State of Texas shall be in full force and effect from and after November 1, 1900, and shall remain in effect for one year thereafter, unless otherwise ordered in due form of law.

In witness whereof I have hereunto set my hand and caused the seal of the State to be affixed at Austin, the 20th day of October, A. D. 1900.

J. N. BROWNING,

*Lieutenant-Governor and Acting Governor.*

By the Governor:

D. H. HARDY, *Secretary of State.*

## UTAH.

The enforcement of the laws of Utah relating to the public health devolves upon a State Board of Health, consisting of seven persons, appointed by the Governor. One of the duties of the board is to make "investigations and inquiries respecting the causes of diseases, especially of epidemic diseases, including those of domestic animals."

Tuberculosis is implied in the section prohibiting the importation of "any domestic animals afflicted with a contagious or infectious disease." Domestic animals so affected are not permitted to run at large, and may not be sold without disclosing their condition to the purchaser. Such animals must be kept separate from others.

A special act relative to bovine tuberculosis, passed in 1899, provides that cattle having tuberculosis shall not be kept by dairymen, but shall be killed by the Dairy and Food Commissioner. There appears to be no provision for the tuberculin test or indemnity.

Sections of the Revised Statutes bearing upon tuberculosis as one of the infectious diseases of animals are as follows:

## LAW.

58. Any person owning or having in charge any domestic animal afflicted with a contagious or infectious disease, that, knowing such animal to be diseased, shall bring or drive the same into this State, shall be deemed guilty of a misdemeanor.

60. Any person owning or having in charge any domestic animal afflicted with a contagious or infectious disease, that, knowing such animal to be diseased, shall allow it to run at large upon any uninclosed land, common, or highway, or that shall sell or dispose of such animal without fully disclosing its condition to the purchaser, shall be deemed guilty of a misdemeanor.

61. Any person owning or having in charge any domestic animal afflicted with a contagious or infectious disease shall immediately remove the same to some place where it can not endanger the health of other domestic animals.

62. Any person violating any of the provisions of this chapter, in addition to the penalties herein provided, shall be liable for all damages that may accrue to any party damaged by reason of said animal imparting disease.

67. If the owner or person in charge of any such animal at the time of its death shall fail to remove or bury the same, as in this chapter provided, any citizen may bury or remove such animal and collect pay therefor from the owner, if known, or from the county where the owner is unknown. It shall be the duty of all sheriffs, constables, and city marshals to see that the provisions of this chapter are carried into effect.

AN ACT to prevent persons selling or furnishing milk or dairy products, from keeping cattle having tuberculosis or other contagious or infectious diseases. Approved, March 9, 1899.

*Be it enacted by the Legislature of the State of Utah:*

SECTION 1. No person selling, exchanging, furnishing, or delivering milk or dairy products shall have in his possession, at any place where milch cows are kept, any cattle having tuberculosis or other infectious or contagious disease.

SEC. 2. It shall be the duty of the Dairy and Food Commissioner of this State, in case he shall find that cattle are kept in violation of the provisions of this act, to cause all such cattle, having any contagious or infectious disease, to be killed.



SEC. 3. Any person violating the provisions of this act shall be guilty of a misdemeanor.

SEC. 4. This act shall take effect upon approval.

#### RULES AND REGULATIONS.

Rules and Regulations of State Board of Health relating to diseased animals, adopted April 20, 1898.

No animals driven or shipped from infected districts, within the quarantine line defined by the United States Department of Agriculture, shall enter the State of Utah unless they shall first have been inspected at the points designated by the State Board of Health by an inspector of the State of Utah and found to be free from any contagious or infectious disease or fever ticks: *Provided*, That cattle may be shipped through the State, on condition that if found to be infected with splenic, or Texas, fever, they must be placed in quarantine pens when unloaded for feeding and watering.

Inspectors having inspected animals from the quarantine district prescribed, and having found the said animals free from all contagious or infectious diseases and fever ticks, shall issue a certificate of health.

All cattle offered for shipment without a certificate of health from the said inspector, shall be regarded as infected and must follow the rules and regulations hereinbefore stated.

The expense of inspection as herein provided shall be defrayed by the owner or owners of the animals inspected.

#### VERMONT.

In Vermont it is a violation of law to bring domestic animals into the State which are known to be infected with or having been exposed to any contagious or infectious disease. The penalty for this offense is not more than \$500 or less than \$100.

The selectmen of towns and aldermen may make regulations to prevent the spread of such diseases, and shall report all such cases to the Governor.

The Board of Agriculture may prohibit the importation into the State of animals believed to be affected with or exposed to any contagious or infectious disease, or may quarantine the same for such a period of time as may be deemed necessary. It is also the duty of the board to obtain as full information as possible regarding any contagious or infectious disease which may prevail near the borders of the State and publish such information. Should any such disease break out in any town in this State, the board is required to examine into the matter and publish the results of their examination for the benefit of the public.

The Board of Agriculture may quarantine all animals affected with tuberculosis, as well as those that have been exposed to that disease, and may make such investigations and "regulations as they deem necessary for the detection, prevention, treatment, cure, and extirpation of such disease, but shall not apply the tuberculin test without the consent of the owner of the cattle." The tuberculin test is required, however, in the case of cattle imported into the State.



The Board of Agriculture may condemn and order killed any cattle which they believe to be affected with tuberculosis, and may prohibit the sale or removal from the premises of any dairy product from cows so affected.

Animals killed by order of the board are appraised by disinterested persons, said appraisement to be upon the basis of health. The limit of value in such cases is \$40. If upon postmortem an animal is found to be affected, the owner receives one-half the appraised value; if not affected, the full appraisement. The State pays the indemnity. Indemnity does not extend to animals which have not been owned and kept within the State for a period of six months immediately prior to being killed.

The rules and regulations issued by the Board of Agriculture always supersede those issued by selectmen or aldermen.

#### LAW.

(STATUTES OF 1894.)

SEC. 4807. If a person brings into this State any domestic animals which he knows to be infected with an infectious or contagious disease, or exposes such cattle or other animals known to him to be so infected to other cattle and animals not infected with such disease, he shall be fined not more than \$500 and not less than \$100.

SEC. 4808. The selectmen of the towns, and the board of aldermen of the cities of this State, may make and enforce such regulations as they deem proper to prevent the spread of infectious or contagious diseases among domestic animals within their respective towns and cities, and shall inquire into all such cases coming to their knowledge, and shall immediately report the same to the Governor. A person who knowingly violates or refuses to obey such regulations made by such town or city authorities shall be fined \$100.

SEC. 4809. The Board of Agriculture may prohibit the introduction of horses or other domestic animals believed to be infected with or exposed to any contagious disease, into this State, or may quarantine all such animals for such time as the public good requires; but shall not prohibit the transportation of the same in cars through this State.

SEC. 4810. If a person violates such order, after the same has been published three successive days in such newspapers published in this State as the board directs, he shall be fined not more than \$300 for each offense, and every officer or agent of any company, or other person who violates such order, shall be fined as aforesaid. The introduction into this State at the same time of a number of horses, cattle, or other domestic animals, contrary to the orders of such board, shall be deemed a separate and distinct offense for each animal.

SEC. 4811. The board shall endeavor to obtain full information in relation to any contagious disease which may prevail among domestic animals near the borders of the State, and publish and circulate such information at their discretion; and should any such disease break out, or should there be reasonable suspicion of its existence among cattle or other domestic animals in any town in this State, they shall examine the cases and publish the results of their examination for the benefit of the public. The board is also authorized to examine, under oath, in the several towns and cities in this State, all persons possessing or believed to possess knowledge of any material facts concerning the existence or dissemination or danger of dissemination of diseases among domestic animals, and for this purpose shall have

all the power now conferred upon justices of the peace to compel witnesses to attend and testify.

SEC. 4812. All costs and expenses incurred in procuring the attendance of such witnesses shall be allowed by the State Auditor, upon the approval of the Governor, and be paid by the State.

SEC. 4813. When bovine tuberculosis or any contagious disease exists in the State among cattle or other domestic animals, the Board of Agriculture may quarantine all infected animals or such as they suppose have been exposed to the contagion, may prohibit any animal from passing on or over any of the highways near the place of quarantine, may enter upon any premises where there are animals suspected to have bovine tuberculosis or any contagious disease, may employ such expert help and means as they deem necessary to a thorough investigation of such diseases, may make all investigations and regulations they deem necessary for the detection, prevention, treatment, cure, and extirpation of such disease, but shall not apply the tuberculin test without the consent of the owner of the cattle, but in quarantine regulations against cattle imported from without the State the tuberculin test may be applied, and they may condemn and order killed any cattle or other domestic animals believed by said board to be infected with bovine tuberculosis or any contagious disease, and may order the bodies of the same buried or burned, as in their judgment the case may require; may forbid the sale or removal from the premises of any dairy product from cows that are believed to have bovine tuberculosis. Any person who shall knowingly violate or refuse to comply with any order or regulation of such board, made under the authority of this section, shall be fined not more than \$200, or be imprisoned not more than two years, or both.

SEC. 4814. If any person shall sell or offer to sell any cattle or other domestic animal known to him to be infected with bovine tuberculosis or any contagious disease, or any disease dangerous to the public health, or shall sell or offer to sell any part or parts of such cattle or other domestic animal, he shall be fined not more than \$200, or be imprisoned not more than two years, or both.

SEC. 4815. The value of all cattle or other domestic animals killed by the written order of the Board of Agriculture shall be appraised by one of said board and a disinterested person selected by the owner of the condemned animals; but if these two can not agree upon the amount of the appraised value of the animal, they shall select a third disinterested person, who, together with them, shall appraise the animal, such appraisal to be made just before killing, and on a basis of health. The limit of the appraisal of cattle shall be \$40. A postmortem examination shall be made, and if the animal be found affected with bovine tuberculosis or any disease dangerous to the public health, the owner of the animal shall receive one-half the appraised value; but if no bovine tuberculosis or disease dangerous to the public health be found, the owner of the animal shall receive the full amount of the appraisal, and in addition shall receive the slaughtered animal. The amount which the owner is entitled to receive shall be paid by the State to the owner of such animal or animals upon a written order, signed by the member of the board in charge and countersigned by the secretary of said board. No indemnity shall be paid to the owner of condemned cattle or other domestic animals that have not been owned and kept in the State for at least six months previous to the discovery of the disease. Any person who shall knowingly violate or refuse to comply with any regulations made by such Board of Agriculture under the authority and provisions of this section shall be fined not more than \$200, or imprisoned not more than two years, or both.

SEC. 4816. All expenses incurred by the board under the provisions of the three preceding sections shall be allowed by the State Auditor, upon the approval of the Governor, and paid by the State.

SEC. 4817. Whenever the board shall make and publish regulations concerning the extirpation, cure, or treatment of domestic animals infected with, or which have been exposed to, any contagious disease, such regulations shall supersede the regulations made by the selectmen of the several towns, or the board of aldermen of the several cities, upon the same subject: and the operation of such regulations made by said authorities shall be suspended during the time those made by the board as aforesaid are in force.

SEC. 4818. The board shall keep a record of its doings and report the same to the Governor prior to the fifteenth day of September, annually, unless sooner required.

SEC. 4819. All orders, appointments, and notices from the board shall be signed by a majority of the same.

SEC. 4820. [As amended by act of November 7, 1896.] Every prosecution for a violation of any of the provisions of this chapter shall be commenced within six months from the commission thereof.

Below are copied the regulations issued by the Board of Agriculture; also some quotations from the report of Mr. C. J. Bell, Secretary of the Board of Agriculture for the year ended July 1, 1900:

### REGULATIONS.

#### INSPECTION.

I. Owners of cattle in the State may have their herds tested with tuberculin at State expense by applying to the board. Owners of herds, tested by the State, will not be allowed to admit cattle into their herds unless such cattle have been tested or have come from herds tested by the State.

II. All cattle that are judged tuberculous on tests made by the State must be killed and the bodies buried or burned. Owners of herds are required to bear the expense of killing and disposing of the bodies. The hides of the cattle killed will be at the disposal of the owners.

III. Applications for tests will be complied with as far as practicable in the order received. Exceptions to this rule are sometimes made for the purpose of testing herds suspected of being tuberculous and for completing tests in a given locality.

IV. Applications to test a portion of a herd only will always be refused.

V. The board claims the right to retest herds in which disease is found whenever they think best. A second test will not be made in herds where no disease or suspicious cases are found on the first test.

VI. No indemnity will be allowed for cattle killed by their owners and found diseased where no inspection has been made by the board.

VII. Persons having herds tested, from which diseased animals are killed, will be required to observe the rules and directions of the board in disinfecting their premises.

#### DISINFECTION OF STABLES.

*Things required.*—Brooms, pails, hoe, barrel, spray pumps, and a half pound of the following mixture for each five stalls: Corrosive sublimate, ammonium chloride, equal parts, well mixed.

*Directions.*—Remove all live stock, and after sprinkling to lay the dust sweep all dust and dirt from mangers, walls, and floor, scraping loose gummy material clinging to mangers and stanchions with hoe. Mix well one package of disinfecting powder and thirty gallons of water; then dip out in pail and with broom scrub mangers and stanchions; then with spray pump thoroughly drench ceiling, side walls, floor, etc., using at least a barrel of solution to each five stalls.

*Caution.*—This solution is poison, so do not leave pools of it in mangers.



## QUARANTINE.

I. Under the quarantine regulations now in force, no cattle are allowed to enter Vermont from any source, to be held in the State, without a permit from the board. Any common carrier who leaves an animal in the State without being accompanied by such permit, or any person who brings an animal into the State without such permit, is liable to a fine not exceeding \$200.

II. Permits will be issued to persons to bring cattle into the State after such cattle have passed an examination with tuberculin that is satisfactory to the board. Such cattle will be held in quarantine at some place designated by the board until identified and released.

Permits will also be given to persons to bring cattle into the State, and the same shall be held at such place as is designated by the board under quarantine restrictions until tested with tuberculin by some person approved by the board and judged to be free from tuberculosis.

III. All expenses incurred in identifying, releasing, and testing cattle under the preceding rule must be paid by the owner of the cattle.

IV. Applications for permits to bring cattle into the State should be made to the secretary of the board.

Adopted December 16, 1898.

C. J. BELL, *Secretary*.

EAST HARDWICK, VT., *January 2, 1899.*

## THE SECRETARY'S REPORT.

It has seemed hard to some buyers of cattle, and especially to farmers living on the borders of the State, to be obliged to comply with these regulations.

To show the necessity of this I will state only one case. A man from another State, knowing our rules, led a suspicious cow to the State line in the night, a Vermont party being there to purchase. This cow, in three months, changed owners four or five times, but fortunately was kept by herself with the exception of a few days, when she was in one herd, where, upon a test three months later, four were killed that no doubt contracted the disease while this cow was in the stable, and the injury done cost the State over \$50.

The commission have realized the necessity of a strict quarantine, and have required a permit to enter cattle into the State, and upon arrival, unless a satisfactory test previously made, the cattle to be tested by a veterinary acceptable to the commission before the animals were released from quarantine.

Some who have thought best to disregard this rule and have brought in one or more head without either the permit or test have been looked up by the commission and asked to pay a small fine, which has been turned over to the State treasury. This the commission have done, believing it to be the best way for some individuals to remember the laws of the State. All cases coming to our knowledge have been looked after and our rules enforced. By this method many head of cattle that would have done injury to our herds have been kept out.

All the New England States except Connecticut have quarantine regulations; some as strict, but none more so than Vermont.

Several of the Middle and Western States have within the year made and are enforcing strict quarantine regulations of cattle brought to them from New England and New York.

Several complaints have come to the commission from the selectmen of a town, director of a creamery, or from some individuals, when we have felt it our duty to look into the matter, and the commission have in all cases prevailed upon the owner to have the questionable herd tested, and in nearly all cases found the disease, sometimes to an alarming extent.



The commission arranged with the owner of one large herd to have the tuberculin test applied. The owner, perhaps knowing the disease to be there to a considerable extent, although working in every way to rid his herd of the disease, except to have the tuberculin test used, had in the past four years labored in vain, for seventy-eight of the ninety-two head were slaughtered and found diseased. Upon a retest six more were taken, leaving only eight of the herd.

These cattle were kept in a light and well-ventilated stable, and with but a very few exceptions to the inexperienced eye would be considered healthy. They were in fine condition, many of them good beef, yet, upon slaughtering, four-fifths of them were diseased all through.

The commission were informed after the slaughter that the owner had in the past four years quietly buried nearly as many as were killed, in order to keep his herd looking healthy.

Another herd, into which many cattle were imported from time to time, the commission persuaded the owner to have tested. This herd numbered considerably over one hundred head. Among the young cattle we found only one to condemn. The cows were nearly three-fourths diseased. The commission arranged with the owners to quarantine the herd and sell the product out of the State—to the same parties to whom it had been sold for several years—killing many of the most pronounced cases. Some have been slaughtered on a second visit, and the work will be continued until all the diseased ones are stamped out, which will be before many months.

Meanwhile these cows are on a farm by themselves away from all healthy cattle. This arrangement was made by the commission upon condition that the State pay no indemnity for slaughtered cattle.

Many instances could be cited where the cattle owner thought to do better than to use the tuberculin test, but in every case, sooner or later, the fates are against him, and in some quiet spot on the farm the graves can be counted in numbers which shows the herd did not increase even by raising all the calves. The income of the average farmer will not long allow him to continue the business of dairying unless he avails himself of the privileges the State offers him.

The per cent of diseased cattle is greater this year than former years. This is occasioned by testing only where there was a suspicion of disease and more particularly mentioned herds.

The tuberculin test may be relied upon only in experienced hands. Some badly diseased animals will not show a reaction by the injection of so small an amount of tuberculin, but the experienced eye will almost always detect other symptoms after the injection.

The commission require the veterinarians that are employed by the State to inform them of any private tests made that the sale of diseased cattle may be hindered.

Where a test of this kind had been made, eighteen head showed a reaction. The owners were called upon by the commission who offered to take them and slaughter in behalf of the State, but were declined, the owners themselves preferring to dispose of them. After several weeks of delay the cattle were driven to an adjoining town, said to have been sold and were going out of the State. The commission quarantined them and slaughtered without paying any indemnity.

Permits to bring cattle in to pasture without a test and usually without examination have been given to parties in New York, New Hampshire, and on the borders of Massachusetts. But cows coming from the market in Massachusetts for pasture, a test has been required this year, for last season upon test of one carload twelve were returned. Two cows that were slaughtered out of one herd last January were found to have been purchased of a Massachusetts man who had cattle here to pasture last season. The commission did not find the man, but a

relative was found in Vermont who saw fit to pay one-half the appraised value of the cows, which was paid over to the owner of the herd.

More than one thousand head came in to pasture and will be returned at the close of the pasture season. Permits other than pasture permits have been issued for nearly seventeen hundred head to come into the State. All these have been tested except young calves, and these were required to come, as much as possible, from healthy herds.

In the opinion of the commission Vermont is gaining in reputation as a State for healthy cattle, and in many of the towns where all the cattle have been raised tuberculosis does not exist, unless brought in by the purchase of some improved stock.

Some of the larger towns and cities would do well to require of the milkmen that their herds be tested, for there are some localities in Vermont where there is reason to believe tuberculosis exists to some extent. There are some towns that could be named where cattle buyers cease to go to purchase cattle after the first visit.

The belief of some that no disease exists among cattle and by others who possibly may have suspicion, but do not wish to know the fact, aids very much in keeping cattle in circulation in different parts of the State, and does not lessen the distribution of the germs of disease.

## VIRGINIA.

Virginia has a law for the control of infectious and contagious diseases of live stock, the fourteenth section of which specifies that "tuberculosis shall be classed as a highly contagious and infectious disease." The duty of administering this law is placed with the Board of Control of the Agricultural and Mechanical College, who are "authorized and empowered to establish, maintain, and enforce such quarantine lines and sanitary rules and regulations as they may deem necessary." This board may also cooperate with like officers of other States and the Bureau of Animal Industry in the work against such diseases.

The veterinarian of the Experiment Station, by direction of the board, makes careful examination of animals believed to be affected with any contagious or infectious disease; and, if found to exist, the board establishes such quarantine lines as may be necessary to prevent the spread of any such disease, and to prescribe proper rules and regulations. When this is done, the facts are reported to the Governor, who issues a proclamation making permanent the temporary quarantine and the rules and regulations adopted.

Whenever in the opinion of the board an infectious or contagious disease exists among the live stock of other States or Territories, they shall report the fact to the Governor, who issues a proclamation prohibiting the importation of live stock of the kind diseased into the State, unless accompanied by a certificate of health.

Transportation companies shall not knowingly violate any of the provisions of the act or of the rules and regulations.

It is made the duty of owners or agents to report to the county board of supervisors any animals which they may discover or have

reason to believe are affected with any contagious or infectious disease. The supervisors cause an investigation to be made, and, if they have reason to believe that an animal is so affected, establish a temporary quarantine until the Board of Control takes charge of the matter.

No one having an animal so diseased, knowing it to be so, shall permit it to run at large or allow it to come in contact with animals not diseased, or shall ship, drive, sell, or give it away.

The general penalty for violation of any of the provisions of this act or of any of the rules and regulations of the Board of Control is a sum not less than \$10 nor more than \$100.

#### LAW.

AN ACT to provide for the protection of domestic animals, and to authorize and empower the Board of Control of the Experiment Station of the Virginia Agricultural and Mechanical College at Blacksburg to establish live-stock quarantine lines, rules, and regulations, and to prescribe penalties for violating the same.

1. *Be it enacted by the General Assembly of Virginia*, That it shall be the duty of the Board of Control of the Experiment Station of the Virginia Agricultural and Mechanical College at Blacksburg to protect the domestic animals of this State from all contagious or infectious diseases of a malignant character, whether said diseases exist in the State or elsewhere, and for this purpose they are hereby authorized and empowered to establish, maintain, and enforce such quarantine lines and sanitary rules and regulations as they may deem necessary. It shall also be the duty of said board to cooperate with live-stock quarantine commissioners and officers of other States and Territories, and with the United States Secretary of Agriculture, in establishing such interstate quarantine lines, rules, and regulations as shall best protect the live-stock industry of this State against Texas, or splenic, fever. It shall be the duty of said board, upon receipt of reliable information of the existence among the domestic animals of the State of any malignant disease, to cause the veterinarian employed at said Experiment Station to go at once to the place where any such disease is alleged to exist and make a careful examination of the animals believed to be affected with any such disease, and ascertain, if possible, what, if any, disease exists among the live stock reported to be affected, and whether the same is contagious or infectious; and if said disease is found to be of a malignant, contagious, or infectious character they shall direct and enforce such quarantine lines and sanitary regulations as are necessary to prevent the spread of any such disease. And no domestic animal infected with disease, or capable of communicating the same, shall be permitted to enter or leave the district, premises, or grounds so quarantined except by authority of the said board or its veterinarian. The said board shall also from time to time give and enforce such directions and prescribe such rules and regulations as to separating, feeding, and caring for such diseased and exposed animals as they shall deem necessary to prevent the animals so affected with such disease, or capable of communicating disease, from coming in contact with other animals not so affected. And the said board and its veterinarian are hereby authorized and empowered to enter upon any grounds or premises to carry out the provisions of this act.

2. When the said board shall have determined the quarantine lines and other regulations necessary to prevent the spread among domestic animals of this State of any malignant, contagious, or infectious disease found to exist among the live stock of this State or elsewhere, and given their orders as hereinbefore provided, prescribing quarantine and other regulations, they shall notify the Governor of



the State, who shall issue his proclamation, proclaiming the boundary of such quarantine around such diseased stock, and the orders, rules, and regulations prescribed by the board; and said board shall give such notice as to it may seem best to make the quarantine established by them effective.

3. The said board shall have power to carry into full effect all orders by them given, as hereinbefore provided, and the expense incurred by it shall be paid out of the Treasury of the State on warrants drawn by the chairman of said board: *Provided*, That no expense shall be incurred except such as may be necessary to carry into effect the necessary quarantine and other regulations prescribed by said board. And said board shall have the power to direct the veterinarian employed at said experiment station to assist it in the investigation of the diseases amongst the live stock of this State whenever they may deem his services necessary: *Provided*, That no compensation shall be paid said veterinarian other than his actual expenses while engaged in such duties.

4. When the said board shall have good reason to believe that the health of the live stock of the State is endangered by the existence of contagious and infectious diseases in certain localities in other States, Territories, or counties, or that there are conditions which render such domestic animals from such infected districts liable to convey such disease, they shall notify the Governor, who shall by proclamation prohibit the importation of any live stock of the kind diseased into the State, unless accompanied by a certificate of health given by a properly authorized veterinarian, and all such animals arriving in this State shall be examined immediately by a veterinarian designated by the board, and if in his opinion there is any danger from contagion or infection, they shall be placed in close quarantine at the expense of the owner until such danger of infection or contagion is passed, when they shall be released by order of the said veterinarian.

5. It shall be the duty of the railway corporations doing business in the State to cleanse and disinfect the cars used by them in transporting live stock in or through this State at such times and places, and in such manner as the board may designate, whenever, in the opinion of the board, any such order may be necessary to prevent the spread of infectious or contagious disease. Any such corporation violating the provisions of this section shall be liable to a penalty of \$500 for each offense, to be recovered in a civil action to be prosecuted under the direction of the Attorney-General in the name of the Commonwealth of Virginia.

6. Any railroad company, navigation company, or other corporation or common carrier who shall knowingly or wilfully violate, disregard, or evade any of the rules or directions of the board or veterinarian, establishing or governing quarantine, or who shall evade or attempt to evade, any quarantine proclamation of the Governor of this State declaring quarantine limits, upon conviction thereof shall be fined not less than \$500 nor more than \$5,000 for each and every offense, and shall be liable for all damages caused to any live stock by its failure to comply with the requirements of this act.

7. It shall be the duty of any owner or person in charge of any domestic animal or animals who discovers, suspects, or has reason to believe that any of his domestic animals or domestic animals in his charge are affected with any contagious or infectious disease to immediately report such fact, belief, or suspicion to the said board and to the chairman of the board of supervisors of the county in which said domestic animals are found.

8. The board of supervisors of each county, whenever any cases of contagious or infectious diseases are reported to them in their county, shall immediately investigate the same. The investigation may be made by the board or any member thereof, or by the employment of a qualified veterinarian; and should such investigation show a reasonable probability that a domestic animal is affected with a contagious or infectious disease, the supervisors shall immediately establish such temporary quarantine as may be necessary to prevent the spread of the disease,



and report all action taken to the Board of Control of the Experiment Station of the Virginia Agricultural and Mechanical College and Polytechnic Institute at Blacksburg, or some member thereof; and the acts of the supervisors establishing temporary quarantine shall have the same force and effect as though established by the Board of Control itself, until such time as the said Board of Control shall take charge of the case or cases. And that the board of supervisors of each county be hereby authorized and empowered to quarantine against any other county in the State of Virginia on account of Texas, or splenic, fever or parasites, which may convey said disease, under the supervision of the Board of Control of the Virginia Agricultural Experiment Station, or its veterinarian. Before establishing such county quarantine the board of supervisors shall advise with the Board of Control or its veterinarian, and the county quarantine established by the board of supervisors shall conform to the rules and regulations which may be prescribed by the Board of Control or its veterinarian. It shall be the duty of the board of supervisors to rigidly enforce any such quarantine established in their county, and all expenses incurred by said supervisors in carrying out such quarantine shall be paid in like manner as other expenses incurred by said supervisors in the discharge of their official duties. The quarantine established against other infected counties may be so established without proclamation by the Governor.

9. Any person who shall knowingly bring into this State any domestic animal which is infected with any contagious or infectious disease, or any animal which has been exposed to any contagious or infectious disease, or which bears upon its body fever ticks or other germs or causes of disease, shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be fined in any sum not less than \$100 nor more than \$500.

10. Any person who owns or is in possession of live stock which is reported to be affected with any contagious or infectious disease, or insects which may produce disease, who shall refuse to allow said board, or anyone acting under its order, to examine such stock, or shall hinder or obstruct the said board or appointee in any examination of or any attempt to examine such stock, shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be fined in any sum not less than \$100 nor more than \$500.

11. Any person who shall have in his possession any domestic animal infected with any contagious or infectious disease or fever ticks, knowing such animals to be affected, who shall permit such animal to run at large, or who shall keep such animal where other domestic animals not affected by or previously exposed to such disease may be exposed to its infection or contagion, or who shall ship, drive, sell, trade, or give away such diseased animal or animals which have been exposed to such infection or contagion, or who shall move or drive any domestic animal in violation of any direction, rule, regulation, or order of the Board of Control, establishing and regulating live stock quarantine, shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be fined in any sum not less than \$10 nor more than \$100 for each of such exposed or diseased domestic animals which he shall permit to run at large or sell, ship, drive, trade, or give away in violation of the provisions of this act: *Provided*, That any owner of domestic animals which have been affected with or exposed to any contagious or infectious disease may dispose of the same after having obtained from the said board or veterinary surgeon a bill of health for such animal or animals.

12. The said board shall have power to call upon any sheriff or deputy sheriff or constable to execute their orders, and such officer shall obey the orders of said board, and the officer or officers performing these duties shall each be entitled to \$1.50 per day for himself and horse, which payment shall be made upon a sworn account, approved by said board, provided said expenses under this section shall not exceed in any event \$500 per annum.

13. Except as otherwise provided in this act, any person who shall violate, disregard, or evade or attempt to violate, disregard, or evade any of its provisions, or who shall violate, disregard, or evade or attempt to violate, disregard, or evade any of the rules, regulations, orders, or directions of the said board establishing and governing quarantine, shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be fined in any sum not less than \$10 nor more than \$100.

14. *Be it further enacted*, That the disease known as tuberculosis shall be classed as a highly contagious and infectious disease, and such measures shall be taken by the board and its authorized veterinarian as to them may seem necessary to eradicate and prevent the spread of said disease.

15. This act shall be in force from its passage.

### WASHINGTON.

The enforcement of the laws of Washington against contagious and infectious diseases is in the hands of the State Veterinarian, who is appointed by the regents of the State Agricultural College. This veterinarian has supervision of all cases of contagious or infectious diseases of animals within the State or which may be in transit through it; he may also quarantine diseased or exposed animals, and, with the concurrence of the State Board of Health, of which he is a member ex officio, make rules and regulations to prevent the spread or suppression of contagious or infectious diseases.

The veterinarian is directed to respond to any call by any local board of health, county commissioners, or city council, or appoint a substitute.

Whenever in the judgment of the veterinarian any stock is affected with a contagious or infectious disease, and the owner of the same will not consent to their destruction, he shall notify the Governor, who appoints an arbitration board.

The Governor and State Veterinarian are authorized to cooperate with the Bureau of Animal Industry for the purposes of the act.

### LAW.

AN ACT providing for the creation of the office of the State Veterinary Surgeon and defining his duties. (Approved March 22, 1895.)

*Be it enacted by the Legislature of the State of Washington:*

SECTION 1. There shall be and hereby is created the office of State Veterinarian, which office shall be vested in the professor of veterinary science of the Agricultural College and Experiment Station, who shall be chosen in the same manner as other members of the faculty and station staff of said college and station, and shall serve as State Veterinarian without compensation in addition to the salary paid by the college and experiment station. The Veterinary Surgeon shall be a graduate of some regular and established veterinary college and shall be skilled in veterinary science. He shall be a member of the State Board of Health, which membership shall be in addition to that now provided for by law. He shall be under the direction of the president of the State Agricultural College and director of the Experiment Station and School of Science, and perform such duties as the board of regents may prescribe. When actually engaged in the discharge of his official duties outside the said college and experiment station he shall receive, in

addition to his salary, actual transportation expenses, which shall be presented to the president of the college under oath and covered with written vouchers before receiving the same. He shall receive as salary such compensation as the regents of the State Agricultural College may determine.

SEC. 2. He shall have general supervision of all contagious and infectious diseases among the domestic animals within or that may be in transit through the State, and he is empowered to establish quarantine against animals thus diseased or that have been exposed to others thus diseased, whether within or without the State, and may, with the concurrence of the State Board of Health, make rules and regulations such as he may deem necessary for the preservation against the spread and for the suppression of said disease or diseases, which rules and regulations, after the concurrence of the Governor, shall be published and enforced; and in doing said things he shall have the power to call on any one or more peace officers, whose duty it shall be to give all assistance in their power.

SEC. 3. Any person who wilfully hinders, obstructs, or resists said Veterinary Surgeon or his assistants, or any peace officer acting under him or them when engaged in the duties or exercising the powers herein conferred shall be guilty of a misdemeanor, and punished accordingly.

SEC. 4. Whenever a majority of any board of health, county commissioners, city council, trustees of incorporated towns or townships, whether in session or not, shall, in writing or by telegraph, notify the State Veterinary Surgeon of the prevalence of or probable danger from any of said diseases, he shall at once repair to the place designated in said notice and take such action as the exigencies may demand, and he may in case of emergencies appoint substitutes or assistants, with equal powers, whose compensation shall be \$5 per day and actual traveling expenses.

SEC. 5. Whenever in the opinion of the State Veterinary Surgeon the public demands the destruction of any such stock under the provisions of this act, he shall, unless the owner or owners of such stock consent to such destruction, notify the Governor, unless in his judgment immediate action is necessary. The Governor may appoint one or more competent veterinary surgeons to act in conjunction with the State Veterinary Surgeon, and no stock shall be destroyed except on the written order by the State Veterinary Surgeon. The Governor of the State with the State Veterinary Surgeon may cooperate with the Government of the United States for the objects of this act, and the Governor is hereby authorized to receive and receipt for any money receivable by this State through provisions of any act of Congress which may at any time be in force upon this subject, and to pay the same into the State treasury, to be used according to the act of Congress and the provisions of this act.

#### REGULATIONS.

Regulations for controlling contagious diseases in animals in the State of Washington, under the provisions of Section 2, Chapter 167, of the Session Laws of 1895:

1. All cattle brought into this State must have been, within three months prior to their importation, submitted to the tuberculin test, from which no reaction occurred, which shall be certified to by a competent veterinarian.

2. [Refers to the dipping of sheep.]

3. [Refers to importation of pigs.]

S. B. NELSON,  
*State Veterinarian.*

Concurred in by the State Board of Health:

J. B. EAGLESON, *President.*  
G. S. ARMSTRONG, *Secretary.*

Approved:

J. H. MCGRAW, *Governor.*



## WEST VIRGINIA.

West Virginia has no specific laws relative to tuberculosis; legislation bearing indirectly upon the subject is embodied in the act concerning contagious diseases among domestic animals, which is published below.

This law places the duty of its enforcement upon the President of the State Board of Agriculture, who is empowered to quarantine animals, buildings, and farms, and to prevent the movement of objects likely to convey disease; also, with the approval of the State Board of Agriculture, to make rules and regulations for the government of the quarantine. Violations of the provisions of the quarantine are punishable by imprisonment not exceeding three months, or by fine not exceeding \$100, or by both fine and imprisonment.

Animals may be killed to prevent the spread of disease, after appraisement by three disinterested persons, who shall take into consideration the condition of the animals at the time when the appraisement is made, and the owner of animals so destroyed shall receive from the Secretary of the State Board of Agriculture a certificate of value in accordance with the appraisement, subject to the approval of the board. The holders of such certificates are paid their value at the end of the year, provided the total amount does not exceed \$3,000, "which amount shall be paid pro rata at the end of each fiscal year on order signed by the President and Secretary of the State Board of Agriculture."

## LAW.

AN ACT to prevent the spread of contagious diseases among domestic animals. (Passed February 24, 1899. In effect ninety days after passage.)

*Be it enacted by the Legislature of West Virginia:*

That Chapter 9 of the Acts of 1897 be amended and reenacted, with additional sections thereto, so as to read as follows:

SECTION 1. That when it shall be brought to the notice of the President of the State Board of Agriculture that any contagious or infectious disease, not otherwise provided for by law, prevails among domestic animals, he shall take such measures to prevent its spread as may be deemed expedient, and for this purpose shall have power to place infected animals, herds, buildings, and farms in quarantine and to prevent the movement of animals or objects likely to convey the contagion, except under proper permits, and, with the consent and approval of said board, to make such rules and regulations for the government of such quarantine as may be deemed necessary to effectively carry out the provisions of this act.

SEC. 2. That any person or persons who shall willfully or intentionally interfere with any officer or officers duly authorized to carry out the provisions of this act, or who shall willfully or intentionally violate the provisions of the quarantine authorized by Section 1 of this act, shall be deemed guilty of a misdemeanor, and upon conviction shall be liable to an imprisonment not exceeding three months, or a fine not exceeding \$100, or both, at the discretion of the court.

SEC. 3. That when, in the judgment of the President of the Board, public interest and safety demand it, he may give written authority to any consulting veteri-



narian of the board, who shall be a graduate of some reputable veterinary college, or he may go in person, taking such veterinarian with him, to examine any animal or animals or any buildings or farms suspected, and the decision of such veterinarian, or the President of the Board and veterinarian acting together, after proper examination, and under the provisions of this act, and such rules and regulations as the board may prescribe, shall be final, and the veterinarian or the President of the Board and the veterinarian acting together shall proceed to quarantine, to destroy, to order burned or buried, or to take any other action authorized by this act and the rules of the said board.

It is hereby made the duty of the veterinarian having charge of any case, or the President or veterinarian acting together, to make a full and complete report of the same in writing to the Secretary of said board under such rules and in such form as may be by it required.

For such services the President and veterinarian shall each receive a per diem of \$4 per day and actual expenses while so engaged, which shall be paid out of current appropriations made for the enforcement of this act and on order signed by the President and Secretary of the board.

SEC. 4. That when it shall be found necessary or expedient to kill any animal or animals to prevent the spread of contagious or infectious diseases, it or they shall first be appraised by three disinterested and sworn appraisers, who shall have due consideration of the actual condition of the animal or animals at the time of appraisal, and the owner or owners of such animal or animals so destroyed shall be entitled to receive from the Secretary of the Board of Agriculture a certificate of value, as appraised by said appraisers, subject to the consent and approval of the said board.

For such services each appraiser shall receive a per diem of \$1 per day, to be paid out of current appropriations made for the enforcement of this act, and on order signed by the President and Secretary of the said board.

SEC. 5. That at the end of each fiscal year the holders of such certificates of value issued by the Secretary of said board shall be paid the same from current appropriations made for the purpose: *Provided*, That the amount to be paid on such certificates in any one year shall not exceed the sum of \$3,000, which amount shall be paid pro rata at the end of each fiscal year on order signed by the President and Secretary of the State Board of Agriculture.

SEC. 6. That for the economical eradication of contagious or infectious diseases of domestic animals the President of the State Board of Agriculture shall have power, with the consent and approval of said board, to arrange for and carry into effect terms of cooperation with the proper officers of the National Government.

SEC. 7. That all acts or parts of acts inconsistent herewith are hereby repealed.

## WISCONSIN.

There is no specific law regarding tuberculosis in Wisconsin; it is treated as one of the "contagious and infectious diseases." The enforcement of laws relative to such diseases appears to be in the hands of a State Veterinarian and the State Board of Health.

Local boards of health shall take cognizance of the existence of contagious and infectious diseases, reporting the same to the State Veterinarian, and order the quarantine of any animal so diseased or exposed to such a disease. The State Veterinarian may also quarantine in like manner. The penalty for violation of the quarantine rules shall be the liability of the offender to all persons injured for the damages sustained and himself forfeit all right to indemnity.

The State Veterinarian may order any animal affected, or suspected of being affected, with any contagious or infectious disease to be slaughtered, after appraisement, in accordance with law. The value of the animal is determined upon its condition at the time the appraisement is made. The amount paid as indemnity by the State is two-thirds of the appraised value, except in cases where it becomes evident that the appraisement is too large. No right to indemnity shall exist in the following cases: (1) For animals owned by the United States, the State of Wisconsin, or any county, city, town, or village in Wisconsin. (2) For animals brought into the State contrary to law or where the owner has failed to comply with the provisions of law. (3) For animals known to be diseased when purchased. (4) For animals known to be diseased at the time of their arrival in the State. (5) For animals which have been exposed wilfully to such diseases or by the negligence of the owner. The slaughtering is done under the direction of the board of health.

The Governor is empowered, upon recommendation of the State Veterinarian, to issue a proclamation prohibiting the entry into the State of any animals affected with contagious or infectious diseases, except under such restrictions as the State Veterinarian may make.

Owners of animals so diseased or their agents are required to report the fact to the local board of health, who reports to the State Veterinarian for his action.

The veterinary laws of Wisconsin, which in general may apply to tuberculosis, are as follows:

#### LAWS.

SECTION 1492, W. S. 1898. The Governor shall, with the advice and consent of the Senate, appoint a competent veterinary surgeon to the office of State Veterinarian; such appointment shall be made for the term of two years and until the qualification of his successor. The person so appointed shall take an oath of office which shall be filed in the office of the Secretary of State. It shall be the duty of such veterinarian to prevent the introduction or spread of contagious and infectious diseases among domestic animals in this State, to cooperate with the State Board of Health in controlling and suppressing such diseases as are common to men and animals or any diseased condition of animals likely to have a deleterious effect upon the general health of human beings, to make such scientific study, investigations, and experiments as he shall deem necessary in relation to the prevention and cure of diseases among animals and extend information concerning the same.

SEC. 1492a, W. S. 1898. The various town, village, and city boards of health shall take cognizance of the existence of contagious and infectious diseases among animals, report all cases thereof coming under their observation in their respective localities to the State Veterinarian and cooperate with him to prevent their spread; any such board or the health officer thereof may order that any animal affected or suspected of being affected with any such disease, or which has been exposed thereto, shall be quarantined, and the removal thereof from any premises where it may be ordered to be kept shall be forbidden. If any such board shall be unable to determine the nature of any disease prevailing among animals, they may request

the State Veterinarian to investigate the same. Said veterinarian may quarantine premises upon which is a domestic animal afflicted with a contagious or infectious disease or that is suspected to be so afflicted or that has been exposed to such disease, and forbid the removal of any such animal or any animal susceptible to such disease therefrom by serving a written order upon the occupant or owner of such premises and by posting a copy of such order at the usual entrance thereto; and if any such disease shall become epidemic in any locality he shall immediately notify the Governor, who may thereupon issue a proclamation quarantining such locality and forbidding the removal therefrom of any animal of the kind so diseased or of any kind susceptible to such disease without the written permission of the State Veterinarian. Any person who shall remove or allow the removal, without such permission, of any animal quarantined under the provisions of this section shall be punished as provided by law, be liable to all persons injured thereby for the damages sustained, and forfeit all right to the indemnity which he might be entitled to under Section 1492b.

SEC. 1492b, W. S. 1898. In case an infectious or contagious disease of a malignant or fatal nature, such as rinderpest, foot-and-mouth disease, pleuropneumonia, anthrax, and Texas fever among bovines, glanders among equines, anthrax in sheep, and other diseases of like nature or fatal tendency shall become or there is good reason to believe that either of them will become prevalent in the community in which any such disease exists, the State Veterinarian may, if in his judgment it shall be necessary, order any diseased animal or animals or any which have been exposed to an infectious or contagious disease to be slaughtered; but if he shall have any doubt concerning the nature of the disease which afflicts any animal or the advisability of slaughtering the same he may call in consultation one or two veterinary surgeons and confer with the State Board of Health, and for the purpose of ascertaining the nature of a disease may order the slaughter of any animal or animals suffering therewith. Whenever such slaughter shall be deemed by him to be necessary the State Veterinarian shall give written notice to the owner, his agent, or the person in whose possession such animal may be, and to a justice of the peace in the county in which the animal may be, of his purpose to order the slaughter thereof, and shall give a description of the animal or animals and state the owner's name if known. Said notice shall be entered upon the docket of such justice, who shall immediately thereafter summon such owner, agent, or possessor and three disinterested citizens of the county, not residents of the immediate neighborhood in which such animal is owned or kept, to appraise the value thereof. Such appraisers shall, before entering upon the discharge of their duty, be sworn by such justice to make a true appraisal, without prejudice or favor, of the value of such animal, and shall certify in their return that they have seen the appraised animal destroyed. In making appraisal of a diseased animal the appraisers shall determine its value in the condition in which it is at that time; but the appraised value of a horse afflicted with glanders shall in no case exceed \$50. The slaughter of animals which have been so appraised shall be made under the direction of the local health officer or the chairman of the board.

SEC. 1492c, W. S. 1898. Whenever the State Veterinarian shall have reason to believe that there is danger of the introduction into this State of any contagious or infectious disease prevailing among domestic animals in any locality without the State, he shall immediately investigate the conditions there existing with reference to such danger, and if he concludes that such danger exists shall forthwith so report in writing to the Governor and recommend the adoption of such measures as he may deem necessary; the Governor may thereupon, by proclamation, designate the locality or localities from which danger is apprehended and prohibit the importation therefrom into this State of any animals of the kind diseased, except under such restrictions as the State Veterinarian may make. It shall be the duty of every person who shall have reason to suspect that there is upon his



premises, or upon premises over which he has control, whether as agent or otherwise, any domestic animal afflicted with a contagious or infectious disease to immediately report the fact to the local board of health or some member thereof, and such board or member shall forthwith make report thereof to the State Veterinarian. That officer may enter upon any premises or go into any building or place where he has reason to suspect there may be diseased animals, and may call to his aid, whenever necessary, the sheriff or any constable of the county in which such animals may be, and all such officers when so called upon shall assist the State Veterinarian in the enforcement of the provisions of this and the three preceding sections. All domestic animals in this State, whether here permanently or in transit, are within such sections and the two next following.

SEC. 1492*d*, W. S. 1898. All claims against the State arising from the slaughter of animals as above provided shall be made by filing with the Secretary of State a copy of the State Veterinarian's notice to the justice of the peace and the return of the appraisers to the justice, which notice and return shall be certified by him. The Secretary of State shall examine these, and if satisfied that the amount awarded is just and that the owner of the animals slaughtered is entitled to indemnity, shall issue his warrant for two-thirds of the sum named in such return; but if he shall have reason to believe that the appraised value is greater than the real value of such animals he shall pay such owner such less sum as he shall deem just: *Provided* That the right to indemnity shall not exist nor shall payment be made in either of the following cases:

1. For animals owned by the United States, this State, or any county, city, town, or village in this State.
2. For animals brought into this State contrary to the provisions of Section 1491 or of the preceding section, or where the owner of the animal or the person claiming compensation has failed to comply with the provisions of Section 1492*b* or of the preceding section.
3. When the owner or claimant, at the time of coming into possession of the animal, knew it to be afflicted with a contagious or infectious disease.
4. When the animal slaughtered was diseased at the time of its arrival in this State.
5. When the owner shall have been guilty of negligence or has wilfully exposed such animal to the influence of a contagious or infectious disease.

### WYOMING.

Wyoming has no special law relating to bovine tuberculosis. The disease may be dealt with as one of the "cases of contagious or infectious disease among domestic animals." Chapter 10 of the Revised Statutes (1899) embodies the provisions of laws relative to this class of diseases.

It is the duty of the State Veterinarian to investigate all cases of contagious or infectious diseases that may come to his knowledge; to inspect animals coming into the State if they warrant the presumption that they are to remain in the State.

The State Veterinarian has authority to quarantine infected premises. If a disease becomes epidemic the Governor shall issue a proclamation forbidding animals so diseased from being moved without a certificate from the State Veterinarian showing that they are healthy.

The State Veterinarian may slaughter diseased animals, or animals exposed to disease, provided that before slaughtering an animal that



has been exposed to disease the State Veterinarian shall call in consultation two other veterinarians or physicians and shall have their written indorsement that such action is necessary, and also the written consent of the owner of the animal.

Before any animal is slaughtered it is appraised by three disinterested stock owners, who shall certify to the owner the value decided upon. These claims, when approved by the State Veterinarian, are paid by the State Auditor. The amount of the indemnity is two-thirds of the ordinary value of the animal as determined by the appraisers. The right to indemnity is limited to animals having certain kinds of contagious or infectious diseases, and the total amount of indemnity can not exceed the amount appropriated for the purpose.

#### LAWS.

[From the Revised Statutes of Wyoming, 1899.]

SEC. 147. The duties of said veterinarian shall be as follows: To investigate any and all cases of contagious or infectious disease among domestic animals in this State of which he may have knowledge or which may be brought to his notice by any resident in the locality where such disease exists. It shall also be his duty, in the absence of specific information, to make visits of inspection to any locality where he may have reason to suspect that there is contagious or infectious disease; to inspect, under the regulations of this chapter, all domestic animals that may arrive at any railroad station in this State, when these animals are such as to warrant the presumption that they are intended to remain in the State and are to be or may be used for breeding purposes therein. It shall be the duty of the owner, or, in his absence, of the person in charge of such animals so arriving, to notify the State Veterinarian without delay and not to allow such animals or any of them to leave the place of arrival until they shall have been examined by the veterinarian and his certificate obtained that all are free from disease. No animal pronounced unsound by the veterinarian shall be turned loose, removed, or permitted to escape, but shall be held subject to the order of the veterinarian. Any person failing to comply with this provision shall be deemed guilty of a misdemeanor, and upon conviction shall be fined not less than \$50 nor more than \$500 for each offense.

SEC. 148. In all cases of contagious or infectious disease among domestic animals in this State the veterinarian shall have authority to order the quarantine of the infected premises, and in case such disease shall become epidemic in any locality in this State the veterinarian shall immediately notify the Governor of the State, who shall thereupon issue his proclamation forbidding any animal of the kind among which said epidemic exists to be transferred from said locality without a certificate from the veterinarian showing such animal to be healthy.

SEC. 149. In any case of epidemic disease where premises have been previously quarantined by the State Veterinarian, as before provided, he is further authorized and empowered, when in his judgment necessary, to order the slaughter of any or all diseased animals upon said premises, and of all animals that have been exposed to contagion or infection, under the following restrictions: Said order shall be a written one and shall be made in duplicate, and there shall be a distinct order and duplicate for each owner of the animals condemned, the original of each order to be filed by the veterinarian with the Governor and the duplicate given to said owner. And, further, before slaughtering any animal, or animal that has been exposed only and does not show disease, the veterinarian shall call in consultation with him two

respectable practicing veterinarians or physicians, residents of the State, or, if this be impossible, then two reputable and well-known stock owners, residents of the State, and shall have the written endorsement upon his order of at least one of said consulting physicians or stock owners, stating that such action is necessary, and the consent of the owner or person in charge, before such animal or animals shall be slaughtered.

SEC. 150. Whenever, as herein provided, the State Veterinarian shall order the slaughter of one or more animals, he shall, at the time of making such order, notify in writing the nearest justice of the peace, who shall thereupon summon three disinterested citizens—who shall be stock owners—of the neighborhood to act as appraisers of the value of such animals. Said appraisers, before entering upon the discharge of their duties, shall be sworn to make a true and faithful appraisal without prejudice or favor. They shall, after making their appraisal, return certified copies of their valuation, a separate one being made for each owner, together with an accurate description of each animal slaughtered—giving all brands, ear-marks, wattles, age, sex, and class, as to whether American, half-breed, or Texas—to the justice of the peace by whom they were summoned, who shall, after entering the same upon his record and making an endorsement upon each, showing it to have been properly recorded, return it, together with the duplicate order of the veterinarian, to the person or persons owning the animals slaughtered, and it shall be the duty of the State Veterinarian to superintend the slaughter of such animals as may be condemned and also the destruction of the carcass, which latter shall be by burning to ashes, and shall include every part of the animal and hide, and also excrement as far as possible. He shall cause the said slaughter and burning to be done as cheaply as practicable, and shall pay the expense from the contingent fund hereinafter provided, taking proper vouchers for the same.

SEC. 151. The State Veterinarian shall make a report at the end of every year to the Governor of all matters connected with his work, and the Governor shall transmit to the several boards of county commissioners such parts of said report as may be of general interest to the breeders of live stock. The Governor shall also give information in writing as rapidly as he obtains it to the various boards of county commissioners of each cause of suspicion or first eruption of disease in each locality, its course, and the measures adopted to check it.

SEC. 152. Whenever the Governor of the State shall have good reason to believe that any disease covered by this chapter has become epidemic in certain localities in another State or Territory, or that conditions exist which render domestic animals liable to convey disease, he shall thereupon, by proclamation, schedule such localities and prohibit the importation from them of any live stock of the kind diseased into this State except under such restrictions as he may deem proper. Any corporation or any person or persons who, after the publishing of such proclamation, shall knowingly receive in charge any such animal or animals from any one of said prohibited districts and transport or convey the same within the limits of this State shall be deemed guilty of a misdemeanor, and upon conviction fined not less than \$1,000 nor more than \$10,000 for each and every offense, and shall further become liable for any and all damages and loss that may be sustained by any person or persons by reason of the importation or transportation of such prohibited animals.

SEC. 153. It shall be the duty of any person or persons who shall have or suspect that there is upon his or their premises any case of contagious or infectious disease among domestic animals to immediately report the same to the State Veterinarian, and a failure so to do, or any attempt to conceal the existence of such disease, or to wilfully or maliciously obstruct or resist the said veterinarian in the discharge of his duty as hereinbefore set forth, shall be deemed a misdemeanor, and any person or persons who shall be convicted of any one of the

above acts or omissions shall be fined not less than \$50 nor more than \$500 for each and every offense; shall forfeit all claims to indemnity for loss from the State, and upon conviction a second time shall, in addition to the above-named fine, be imprisoned for a term not less than thirty days nor more than six months.

SEC. 154. The following regulations shall be observed in all cases of disease covered by this chapter:

First. It shall be unlawful to sell, give away, or in any manner part with any animal affected with or suspected of contagious or infectious disease; and in the case of any animal that may be known to have been affected with or exposed to any such disease within one year prior to such disposal, due notice of the fact shall be given in writing to the party receiving the animal.

Second. It shall be unlawful to kill for butcher purposes any such animal, to sell, give away, or use any part of it, or its milk, or to remove any part of the skin. A failure to observe these provisions shall be deemed a misdemeanor and on conviction shall be punished by a fine not less than \$100 nor exceeding \$500. It shall be the duty of the owner or person having in charge any animal affected with or suspected of any contagious or infectious disease to immediately confine the same in a safe place, isolated from other animals, and with all necessary restrictions to prevent dissemination of the disease, until the arrival of the State Veterinarian.

The above regulations shall apply as well to animals in transit through the State as to those resident therein, and the State Veterinarian or his duly authorized agent shall have full authority to examine, whether in car or yard or stables, all animals passing through the State or any part of it, and, on detection or suspicion of disease, to take possession of and treat and, dispose of said animals in the same manner as is prescribed for animals resident in the State.

SEC. 155. All claims against the State arising from the slaughter of animals under the provisions of this chapter shall, together with the order of the veterinarian and the valuation of the appraisers in each case, be submitted to the State Auditor, who shall examine them without unnecessary delay, and for each one that he finds to be equitable and entitled to indemnity under this chapter shall issue his warrant on the State Treasurer for the sum named in the appraiser's report. All claims for indemnity arising under the provisions of this chapter shall, before they are presented for payment to the Auditor, be submitted to the State Veterinarian, who shall fully inform himself of the facts connected with each claim; if he shall be of the opinion that the claim is legal and just, he shall approve the same in writing indorsed thereon; if he shall be of the contrary opinion, he shall reject it in like manner, and in all cases he shall express in such indorsement the reasons for his approval or rejection, as the case may be. If the State Veterinarian shall reject a claim, it shall then, together with the indorsement of the veterinarian, setting forth his reasons for such rejections, be submitted for determination to a board of arbitration, to consist of three members, which shall be formed as follows: The State Veterinarian shall select as one member of said board one stock grower, who shall be a resident of the county wherein the slaughtered animals for which the claim is made ranged. The claimant shall select as such member of said board another stock grower, who shall be a resident of the same county, and these two so selected shall choose the third member of the board from among the stock growers of the same county. The arbitrators shall have power to appoint a time and place for hearing; to adjourn from time to time; to administer oaths to witnesses; to hear the allegations and evidence of the parties, and to make an award thereon. All the arbitrators shall meet and act together during the investigation; but when met, a majority may determine any question. Before acting, they shall each be sworn, before an officer authorized to administer oaths, faithfully and fairly to hear and examine the allegations and evidence of the parties in relation to the claim in controversy, and to make a



just finding according to their understanding and according to the provisions of this chapter. The award of the arbitrators shall simply be to the effect that they find the claim legal and just according to the provisions of this chapter, or the reverse, as the case may be. The award shall be in writing, signed by the arbitrators, or a majority of them, and shall be forwarded by them, with all the papers submitted to them, to the State Auditor. If the board of arbitrators shall concur with the State Veterinarian in rejecting the claim, their decision shall be final. If the board of arbitrators shall find that the claim is legal and just, then the said claim shall in all respects be held as though the State Veterinarian had in the first place approved the same.

In auditing any claim under this chapter it shall be the duty of the Auditor to satisfy himself that it does not come under any class for which indemnity is refused by this chapter, and he shall require the affidavit of the claimant to this fact, or, if the claimant be not cognizant thereof, then of some reputable person who is cognizant thereof, and the Auditor may, at his discretion, require further proof. The indemnity to be granted shall be two-thirds of the ordinary value of the animal as determined by the appraisers, without reference to its diminished value because of being diseased. It shall be paid to the owner upon his application and the presentation of the proofs prescribed herein; and it shall be the duty of said owner to make such application within six months of the slaughter of the animal for which payment is claimed, failing which such claim shall be barred by limitation.

These payments shall be made by the State Treasurer, as before provided, and from the fund provided by this chapter.

The right to indemnity under this chapter is limited to animals destroyed by reason of the existence or suspected existence of some epizootic disease, generally fatal and incurable, such as rinderpest, hoof-and-mouth disease, pleuropneumonia, anthrax, or Texas fever, among bovines, glanders among horses, and anthrax among sheep. For the ordinary contagious diseases not in their nature fatal, such as scab and hoof rot in sheep, and epizootic influenza in horses, no indemnity shall be paid.

The right to indemnity shall not exist and payment of such shall not be made in the following cases:

First. For animals belonging to the United States.

Second. For animals that are brought into the State contrary to the provisions of this chapter.

Third. For animals that are found to be diseased or that are destroyed because they have been exposed to disease before or at the time of their arrival in the State.

Fourth. When an animal was previously affected by any other disease which from its nature and development was incurable and necessarily fatal.

Fifth. When the owner or person in charge shall have knowingly or negligently omitted to comply with the provisions of the last two preceding sections.

Sixth. When the owner or claimant at the time of coming in possession of the animal knew it to be diseased, or received the notice specified in the first clause of the last preceding section.

SEC. 156. Each member of boards of arbitration formed and acting under the provisions of this chapter shall receive for their services the sum of \$5 per day for each day they may be actually engaged and employed in the investigation of any claim, and shall be paid by the State Veterinarian out of the "veterinarian contingent fund."

SEC. 157. The State Veterinarian shall receive for his services the sum of \$1,200 per annum, together with his actual necessary traveling expenses when in the performances of his duty, provided said actual necessary traveling expenses shall not exceed \$750 per annum.



The veterinarian is hereby authorized, in his discretion, to appoint a deputy, for the performance of whose duties the veterinarian shall be responsible, and who shall exercise such powers as may be deputed to him by the State Veterinarian. Such deputy shall receive not exceeding \$4 per day for the time actually employed. The appraisers herein provided for shall each receive \$5 for each day or part of day they may be actually employed as such, which shall be paid from their county fund upon the certificate of the justice who summoned them. The justice shall receive his ordinary fee for issuing a summons, to be paid out of the county fund. The members of the board of health, veterinarians, physicians, or stock owners, called in consultation by the veterinarian, shall each receive \$5 for each day or part of day they may actually be so employed, and 10 cents per mile mileage for distance actually traveled, which sums shall be paid from the veterinarian's contingent fund hereafter provided. For this and other incidental expenses connected with his work, and made his duty by this chapter, such as his traveling expenses, causing animals to be slaughtered and their carcasses burned, and disinfecting infected premises, the veterinarian shall have at his disposal the sum of \$1,200, which shall be known as the veterinarian's contingent fund. Before entering on the discharge of his duties he shall give good and sufficient security in the sum of \$5,000 for the proper management of the same. He shall make a sworn statement semiannually to the Governor, supported by full vouchers of the amount disbursed; and any part of the \$1,200 not used shall be covered into the State Treasury.

SEC. 158. The State Auditor shall pay no claim for indemnity under this chapter which shall have been rejected by the State Veterinarian, unless the same shall have been submitted, as hereinbefore provided, to a board of arbitration and by such board decided to be legal and just. If any claimant shall refuse to submit his or her claim, which shall have been rejected by the State Veterinarian, to a board of arbitration as hereinbefore provided, such refusal shall be deemed conclusive evidence of a waiver of all claim for indemnity under the provisions of this chapter.

SEC. 159. The liability of the State for indemnity for animals destroyed under the provisions of this chapter in any two years is limited by and shall in no case exceed the amount especially appropriated for that purpose and for that period.



U. S. DEPARTMENT OF AGRICULTURE,  
BUREAU OF ANIMAL INDUSTRY.

D. E. SALMON, D. V. M., Chief.

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AMERICAN BREEDS OF FOWLS.

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I.—THE PLYMOUTH ROCK.

BY

T. F. McGREW.



WASHINGTON:  
GOVERNMENT PRINTING OFFICE.

1901.

## LETTER OF TRANSMITTAL.

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U. S. DEPARTMENT OF AGRICULTURE,  
BUREAU OF ANIMAL INDUSTRY,

*Washington, D. C., June 1, 1901.*

SIR: I have the honor to transmit herewith for publication a bulletin on Plymouth Rock fowls, being the first part of a report on American breeds of fowls.

The Plymouth Rock breed is the most popular creation of the American fancier's art. It is not only a beautiful bird, but as a general-purpose fowl it is unsurpassed. It is medium in size, excellent for the table, a good sitter, and at the same time rivals the smaller breeds in activity, hardiness, and egg-laying propensities. It is a favorite breed for the production of broilers and capons, and in the show room it excites the admiration and enthusiasm of all who love to see beauty and symmetry in our domesticated birds.

Nearly everyone is more or less familiar with the general appearance of the Barred Plymouth Rock, but there are comparatively few who understand the different points of these birds, the defects which the farmer tries to avoid, and the ideals of perfection toward which he is striving. The plumage of birds has an even greater effect in the characterization of breeds than have the coats of other farm animals, and hence the breeder pays special attention to the body color and the markings of the feathers on different parts of the body. Those who are strictly utilitarian in their aims may think that too much attention is paid to the feathering; but it should be remembered that the perfection of feathering and the ability to transmit this standard is an evidence of pure breeding and prepotency. Nor should the æsthetic element in the breeding of farm animals be entirely discarded. Beauty of form and beauty of coloring, bred according to a standard of perfection and developed almost to the exact ideals of that standard, serve to excite interest and enthusiasm beyond what can be realized by utilitarian qualities alone.

Considerable attention is properly given by the author of the bulletin to the plumage, the standard requirements, and the methods of breeding by which these are best secured. These are the points upon which information is perhaps most needed. The Buff and the White Rocks receive their due share of attention. Mr. T. F. McGrew, who has prepared the bulletin, is a well-known judge of poultry and a prolific writer on questions relating to breeds and breeding. The illustrations were made by Mr. George E. Howard, and have received the approval of some of the most skillful breeders of these birds.

The time has come when Americans no longer need to go abroad to obtain either beauty or productiveness in fowls. The best breeds that exist have been produced in our own land, and when their merits are fully understood there will be an increasing demand for them in other parts of the world.

Respectfully,

D. E. SALMON,  
*Chief of Bureau.*

Hon. JAMES WILSON,  
*Secretary of Agriculture.*



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# AMERICAN BREEDS OF FOWLS.

## THE PLYMOUTH ROCK.

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### INTRODUCTION.

The introduction of the Asiatic-bred fowls into the New World had great influence for good among our so-called domestic fowls. The Shanghai or original Cochin, and also the gray Asiatic fowl that was the original foundation stock from which our Brahmas were formed, brought increased size and better egg production, and their use as a cross upon our barnyard fowls created a desire for more and better poultry of true breeding.

In the efforts put forth for the advancement of quality in our farm-bred stock use was made, without any concerted understanding, of all the breeds that came to us from other countries. These new and highly esteemed fowls were mixed promiscuously with our home-bred fowls, the result of which gave us the foundation for all of our so-called American breeds. The original foundation stock that has been developed into our Plymouth Rock fowl came from an experimental cross of two birds that were united on account of their egg-producing qualities. The start of what came to be known as Jersey Blues and Rhode Island Reds began under like conditions.

The Brahma was the first breed of fowls that was credited to us as an American production; and, while they are classed as an Asiatic fowl, they are the outcome of great skill in handling the very crude original by our American fanciers, who have given over fifty years of attention to perfecting them. While Americans are given credit the world over for originating the Brahmas, these birds are grouped in our standard of perfection as belonging to the Asiatic class.

In the formation of the breed classes in the American standard of perfection all breeds and their subvarieties that have been made in this country by crossing and by the improvement of other crosses are classed as belonging to the American breeds, or families. These comprise the Plymouth Rock, Wyandotte, Java, and Dominique. They are the acknowledged breeds of our standard, belonging to what are known as the American classes.

### FAMILY COMB DISTINCTION.

The fowls of the American classes have their distinct style of combs, which is an emblem of family difference. The comb is so marked as

to become the guide for the uninformed in selecting the families one from another. The Dominique is known as the Rose Comb Dominique, from the fact that it has the so-called double, or rose, comb. It is a low, thick comb, the upper surface of which is covered with small points, the rear end of which comes to a point called a spike. This spike in the Dominiques should be elevated at the end.



FIG. 1.—American Dominique male.

The Wyandotte also has the rose comb, but it is of a smaller pattern than the comb of the Dominique, and the end or spike turns down to follow the shape of the head; the points on top of comb are not so prominent, nor is the spike so long as is proper for the Dominique. The Plymouth Rock and Java have what is known as the single comb, which is upright and nicely serrated. The combs are so distinctly different as to be easily recognized.



## THE UTILITY VALUE OF THE AMERICAN CLASS.

The American breeds are often termed the "general-purpose fowl," from the fact that when young they make the best of broilers and when matured a most perfect roaster. Their natural formation, inviting plumpness, makes them the desirable market poultry. In addition to all this they have the beautiful yellow skin so much sought after by our people; they are of quick growth as compared with other good-sized fowls, and as egg producers they average nearly the equal of any other breed; they lay a medium-sized brown egg of the very best quality; they are easily kept in good condition, and are among our best winter layers; they are very vigorous and hardy and able to withstand our most changeable climate with as little inconvenience as any known fowl.



FIG. 2.—Head of American Dominique male.

The Rose Comb varieties are least liable to injury by the extreme cold of our Northern climate. At the same time the medium-sized combs of the other varieties are not so large as to be frosted when properly housed, as all poultry should be during the cold months of winter.

## THE AMERICAN DOMINIQUE.

The American Dominique was well known in early days throughout New Jersey and eastern New York as a fowl of great merit as an egg producer. The eggs of this fowl graded A1 in the New York market, and as table poultry it had no superior. At that time the plumage was of a light-gray color, barred across with a darker shade; it had

both the single and double comb, and the shanks and feet were yellow in color. It is claimed for this variety that it was brought to this country by both the French and the Dutch. This is of but little importance, for such birds might be produced at will.

The Dominique color is a combination of black and white. It comes as one of the results of crossing black and white fowls. The mottling of the Java and Houdan and the Ancora are other results of the same methods of mating pure black and pure white fowls together. When the poultryman of the past began selecting the Dominique for improving into a breed that would reproduce itself he preferred birds with the rose comb, the full sweeping tail, and the light-gray ground color barred with the bluish gray. In order that we may have a better conception of the top cross that produced our Plymouth Rocks, the American Dominique as seen in its prime will be described.

The general appearance of the American Dominique was not unlike our present large-sized Brown Leghorns. They were somewhat fuller in breast and deeper in abdomen. The female had a slight inclination toward both fluff and cushion formation; main tail feathers like our present Leghorns, only not quite so extended; breast full and carried rather forward, the male being quite like a large Brown Leghorn male in shape, with a tail almost as full as seen on the Hamburg. Their combs were rather larger than the Hamburg comb, but of the same form, type, and carriage, the rear end, or spike, turned upward, quite unlike the Wyandotte comb, which follows the shape of the head. They had a neck that was arched and covered with very full hackle plumage. Back broad and medium in length; in color and barring quite like an inferiorly marked Barred Plymouth Rock of the lighter shade of color. Such was the general make-up of the Rose Comb American Dominique.

#### SINGLE-COMB FAMILY.

When we consider our American made or adopted breeds some must be mentioned that are not included in the list of so-called "Standard fowls." Some of them must be considered because they were used in creating a portion of our standard varieties, while others have had a position among our standard breeds, but have become obsolete from lack of admirers. At this time those only will be noted which belong to the single-comb family, for they alone will conform to the demands of our Plymouth Rocks. The Rose Comb Dominique has been described first, the object being to keep it entirely separate from the single-comb fowls.

The single-comb fowls which belong to the American classes are these: The Java, the Plymouth Rock, the Jersey Blue, and the Rhode Island Red. All of these are classed as truly American—the Java by adoption and improvement, the others the result of crosses.

## THE JAVA FOWL.

From all information obtained we learn that the early Java (which formed one-half of the original cross which produced the Plymouth Rock) was of Asiatic blood. The illustrations of what were then called the "Great Java" are quite similar to the illustrations of primitive Cochin China fowls, and these, combined with the written description of the Java fowl, point conclusively to Asiatic origin. The importations of these fowls were named after the ports from which they came; thus the same breed came to us under several names.



FIG. 3.—Black Javas.

The Java is described as a large black fowl with single comb and smooth legs, weighing from 18 to 20 pounds per pair. They are spoken of as being among the most valued fowls of the day, and their prolificacy in eggs suggested union with the Dominique, in the hope of gaining a better egg producer than either. Those who made the cross did so without a proper consideration of the result. Both of these breeds had already the highest reputation in this respect, and those who knew their valuable qualities exchanged stock, hoping that by intermingling the new blood they would gain an increased precocity in future stock.



Javas, as we now find them, are simply an improved or modified type of the original. Their general make-up is a long, broad, and deep body. They are the longest in back and body of any of our American breeds. As of Standard formation, they represent the most extended type, the Wyandotte filling the position of compactness, the Plymouth Rock the middle position—giving us three distinct formations. When we bear in mind that the Java type calls for the long back and body, no cushion, and but little inclination toward fluff, full tail and sickle feathers, we have before us the cause of many faults that are continually cropping out in our Plymouth Rocks. Much trouble and delay could be avoided were due consideration given to ancestral conditions when contemplating improvement.

#### THE PLYMOUTH ROCK.

When first produced no other name was needed; they were simply the Plymouth Rock fowls, and became well known under this title the world over. No other fowl has ever enjoyed equal popularity in this country, and we presume they are better known, and at the same time less understood, than any other fowl of minor reputation. More has been written about them than could be read in years, and there have been almost as many opinions and theories placed before us as there are writers. This has caused considerable confusion, until the alarm sounded ascribing retrogression to the breed, when the attention of those best able to cope with the difficulty became attracted, and marked improvement soon followed.

There seems to be no condition, surrounding, or climate unfavorable to the Plymouth Rocks. Their constitutional vigor appears to have no limit. Where any fowl can live they will prosper. They stand confinement, and when allowed freedom prove excellent fragers. They are prolific in yielding medium-sized brown eggs of the richest flavor. Under all conditions they will produce fully as many eggs as any thoroughbred fowl. Below is given their record in competition with others, from which it will be seen where they stand in comparison:

*Yearly contest and calculated egg yield.*

Breeds.	Tests reported.	Eggs laid in contest.	Average yield.	Weight per dozen.
	<i>Number.</i>	<i>Number.</i>	<i>Number.</i>	<i>Ounces.</i>
Barred Plymouth Rocks .....	262	173	150	23
White Plymouth Rocks .....	289	164	150	23
Single-Comb Brown Leghorns .....	277	157	160	19
Single-Comb Buff Leghorns .....		183	160	19
Silver-Laced Wyandottes .....		113	150	21
White Wyandottes .....		176	150	21
Rhode Island Reds .....		166	150	21
Crossbred pullets .....		129		



The first column gives the figures reported from a test under very high feeding and best possible attention. The second gives the figures obtained in selecting from over fifty lots, all reported monthly for a year. In the third column are presented the figures arrived at by calculation and accepted as nearly correct, as results that can be obtained under the best management.

This table records the egg yield of the different lots of fowls entered for competition in annual test, conducted by persons who have had to rely upon the statements of those owning and entering the fowls; and while we naturally hesitate to claim knowledge of their authenticity, at the same time the studious attention bestowed upon the work should assure us that the above figures are a fair average for the fowls competing.

#### ORIGIN OF THE PLYMOUTH ROCK.

The first fowl to bear this name was created by intermingling Cochins, Dorkings, and Malay blood, the result of which was a mongrel of little real value. The knowledge of this inferiority brought an influence against what was to be the most popular breed ever produced. This we know from the fact that when the present Barred Plymouth Rock was first announced those best informed believed it to be the same as before, under other guidance.

Our present type of Plymouth Rocks is the outcome of careful handling of fowls secured from crosses made on the same lines as those reported to have been made in Connecticut almost sixty years ago, where they mated Rose-Comb American Dominique males with Single-Comb Black Java females. These same crosses, also others of like character, are claimed to have been made by persons who had obtained much the same results, but the Rev. H. S. Ramsdell, residing in Connecticut at the time, gives the name Woodstock as the town of their origin, and persons interested he names as Giles, Clark, Thayer, Spaulding, and himself. While this removes all doubt of the origin of this one strain of Plymouth Rocks, it can not detract any credit that may be due to the Messrs. Upham, Pitman, Felch, and others for the part they took in originating this type. However, be this as it may, the real point of interest is, How were they originated and advanced to their present position among high-class, standard-bred fowls?

There can be no reasonable doubt as to the make-up of the original cross having been as stated above, the product of which was grizzled gray and speckled. They were not of solid color, neither were they barred like the Dominique. In size and form they resembled the Java, while their color bespoke the influence of the sire. Those having the best color and single comb among those produced were selected and bred together as the real start of the present perfect fowl. Many subcrosses have since been made, some of which, it may be almost positively recorded, were the Cochins, Dorkings, and Brahmas,

all of which had a tendency for future trouble for those who attempted to produce high-class Plymouth Rocks.

#### PLYMOUTH ROCK SHAPE.

No matter what variety of color they be, the form or shape of all must be the same. The presence of what are known as breed characteristics must be so strong as to stamp them with the unmistakable emblem "Plymouth Rock shape." The importance of this is shown in the fact that some persons can select a White Plymouth Rock from a White Wyandotte only by the difference in comb. This is the outcome of not demanding greater attention to type in the show room, where size, color, and comb are given more credit than is due and too little to the breed emblem—shape.

An effort is here made to make plain the proper shape of a Plymouth Rock and all sections, including head and its belongings, are described as minutely as possible, omitting reference to color, which will be taken up separately.

The head of the male should be medium size, rather round when viewed from the side, fairly prominent in front, back short and stout and nicely curved. The comb single, rather below medium, never large or coarse, but of proper size to give a finished, neat appearance in conformity with size of the specimen; it should be straight, upright, and free from all defects, a perfectly even surface throughout. The serrations must be regular and in uniform proportion, grading fore and aft from the center, where they are largest. The rule is five serrations. The points of the comb must be even and regular. The comb, from the front, where it rests on the beak, should curve gracefully back, finishing with a nicely shaped heel, just forward of the juncture with the head and neck. It should form a half oval over the head, being highest in the center, gently declining either way, neither high in front nor in rear. A twisted, uneven, or thumb-marked comb is much despised; a perfectly formed comb, the crowning effect. A long head or beak is quite improper and should not be tolerated; it destroys the whole appearance of an otherwise handsome specimen.

Wattles should be moderate in size and nicely rounded and of even size and fine texture. When ill shaped or uneven they are a deformity. Ear lobes should be neat, fine, and of equal size, nicely placed on the face below and in the rear of the eyes. A nice, prominent pair of wattles and ear lobes, if of good shape and texture, add much to the appearance of the head.

Eyes should be round, large, bright, and red in color. In the Standard the color is called a clear, rich bay. Weak-colored or pearl eyes are almost a deformity. They look bad, and, in addition to their ill appearance, indicate poor breeding or delicate constitution. The eyes of a strong, vigorous specimen are usually very bright and striking in appearance.



BARRED PLYMOUTH ROCK MALE.







BARRED PLYMOUTH ROCK FEMALE.



A narrow or thin neck on a Plymouth Rock looks very bad. An abundance of plumage forms a full neck where it rests on the shoulders, the neck tapering gradually to the junction of the head. The strong full appearance makes the neck seem shorter than it really is, while a thin, narrow neck looks to be twice the length demanded. A well-proportioned neck, nicely arched from just back of the comb to the body, is the neck required for the well-proportioned specimen.

The back of the Plymouth Rock is one of its most important belongings. We quote in full the Standard description: "Broad, of medium length, and rising with a slight concave sweep of the tail; saddle feathers of medium length and abundant." This description calls for about the same style of back as is mentioned for the Brahma. Note that the Plymouth Rock back is fashioned after that of the Brahma, the Wyandotte back resembling that of the Cochin. No cushion is called for in the Plymouth Rock, while for the Wyandotte male a broad, full saddle is required, the female being slightly cushioned. If these distinctions of back were strictly adhered to, the Plymouth Rock form would be more distinctive.

The broad back of medium length (medium as between the long back of the Java and the short back of the Wyandotte) is essential. Nothing short of this description fills the Standard demand, and a demand of so much importance should be most strictly adhered to. If this description were well understood, and followed to the letter, much of the present confusion as to type would disappear.

Tail formation is quite a factor in the proper finish of back. If the main tail feathers are strong and fairly well spread, they help to build up the back to the proper ending, in accordance with the Standard; but when these feathers are contracted or narrow, they allow the saddle plumage to gather and form the narrow or pinched appearance instead of the proper sweep to the tail. They also spoil the shape of the tail itself, giving a tapering appearance from the shoulders back.

The tail of the Plymouth Rock, in formation and finish, resembles somewhat the tail of the Brahma. The carriage of each is about the same and the sickle feathers and coverts are fashioned much on the same lines. Therefore, when it is stated that the Plymouth Rock back, including the tail, is fashioned after the Brahma, it is hoped that the proper formation of each in accordance with the Standard is properly understood as the meaning. This positively prohibits the Cochin form of back for either.

The under portion of the Plymouth Rock, including breast, under part of body, abdomen, and legs, is of equal importance. The broad, deep, and well-rounded breast gives these fowls their value as table poultry. The notably rounded keel bone that extends well forward helps to build out the foundation for plenty of breast meat, while the strong, full abdomen provides the space for eggs in the female. But

both the male and female are confined within the demand for moderately full fluff only, while in the Wyandotte considerably more fluff is allowed. Here, again, is the fact that while the Cochin form is allowable in the Wyandotte it must not be present in the Plymouth Rock. Wings of medium size, broad and full at the shoulders, help to spread the hackle and widen the shoulders, giving the strong, broad appearance as the specimen faces one, while close, narrow wings help to give the narrow, inferior appearance, such as is often found on what are called undeveloped specimens. The strong, prominent wing point, or bow, which is well built out with under muscles, adds very much to the appearance of the fowl.

A good, large thigh that is supported by stout, well-proportioned shank of medium length, good feet and toes compose the proper leg for the Plymouth Rock. A long leg, thin shank, and ill-shaped toes are incorrect, for without the proper foundation a fowl of such build as the Plymouth Rock could not have that finished appearance demanded for it.

#### A FEW POINTS CONCERNING THE FEMALE.

While the general description given above touches upon the form of both male and female, there are some features of the female which require a more special notice. The most important of these is the tail. This should be so carried as to form a continuation of the back. It should not be so elevated as to form an angle in the back, nor should it droop in the least. To give the best appearance to the back, the main tail feathers may spread out at the base, but should come together at the point.

The most striking feature of a well-formed Barred Plymouth Rock female is a beautiful head and neck, which are most difficult to obtain in any approach to perfection. In many instances the head is large and heavy in appearance, and the barring of the neck gives rather a spotted appearance on the surface, which should show true barring. When of proper make-up, the head is nicely formed and well set on the neck; the beak should be short and strong and nicely curved, so as to present a finished appearance; comb should be neat and rather small, but well defined and of suitable proportions to conform to the head; eyes bright and clear, bay in color; neck nicely curved, gradually widening toward the juncture with the shoulders. This graceful head and neck make a most attractive appearance.

The medium length as demanded for back furnishes correct proportions for a graceful sweep or incline of back toward the tail, as described. This description allows the beautiful back formation that should be free from all appearance of a cushion, for the true Plymouth Rock female should be free from cushion on back and have only a slight showing of fluff. While they are required to be well feathered about the abdomen, there should not be a fluffy formation.



Back, breast, and body should be well rounded and full at point of breast; the wings closely set against the body, and strong at shoulder; main tail feathers standing at a slight incline as if they formed the end of the back. They should be so spread at the base as to form a graceful support to the back without causing a too full appearance at point of wing. The under-filling of the tail should be prominent.

The marking of the Barred Plymouth Rock female, when properly distributed, is grace itself; beginning with the close, narrow bars, just back of the comb and gradually broadening and widening as the tail is approached, there is formed what might be called circles of grayish blue when seen under good lights and conditions. Much depends upon the evenness of barring and the well-defined lines between the two colors; for when either encroaches upon the other the greatest beauty is wanting. This combination of light and dark colors creates the so-called blue tint of the Barred Plymouth Rocks. The beauty depends entirely upon the purity of color and the graceful formation of the bars.

The beak and shanks of the female should be true yellow; but it is a fact that many more have dark spots than have the true color. These dark spots come from the early Java cross, no doubt, and will continue with them for years to come. The shank should be strong and well placed, with no inclination to turn in at the hock. They should be wide rather than narrow at this point.

#### THE BARRED VARIETY.

We have never seen an authentic proof that there is any other native North American fowl than the turkey that has been domesticated. All of our poultry, both land and water fowls, which are classed as domestic poultry, came to us from other lands. Those we have are all the result of careful crossing, mating, and improving. We have always paid the strictest attention to color demands, often at the sacrifice of shape. This is a natural result almost sure to follow close breeding for color. Good, even color of plumage can be procured and maintained in highest perfection only by close line breeding, a natural result being more or less loss of size and good form.

Line breeding, or inbreeding, is an absolute necessity to produce a certain type or color. There is no other way to produce either with any certainty; and, while we are thus guiding our stock into new conditions, we are as surely reducing their size and injuring their shape and vigor. The only sure way to maintain all is to have more than one line of breeding stock, so as to be able to invigorate one by the other with as little injury to color as possible.

Our demand for perfection of color and barring in our Barred Plymouth Rocks has driven all those who produce for exhibition purpose to close line breeding and to the double mating system. These two

methods have proved successful for color, but at the same time have not added more grace or better form to the fowls as a breed. In this particular it has been claimed that our Plymouth Rocks have declined. But we may feel assured that the ability of our American breeders will soon remedy this error, and we shall have far better form than before in addition to perfection of color.

The color demand of the standard is bluish gray, barred with narrow, parallel lines of dark blue, approaching almost to a positive black. The barring is to be close in all sections of the body, and on neck and saddle hackle narrower and closer than in other sections. The barring must positively show the entire length of the feathers in all sections when they are not mostly composed of down. In the



FIG. 4.—Head of Barred Plymouth Rock male.

primaries, secondaries, and feathers of the tail the barring is to be wider than in other sections. The shade of surface color is to be nearly or quite uniform throughout.

The most perfect colored Barred Plymouth Rock is one whose color is so perfectly blended as to present to view the attractive blue shade so continually talked of as belonging to them, but so seldom seen in anything like perfection. When the ground color is of a clear bluish gray and the modified blue black, so-called, and the lines between the two shades are clear-cut and distinct, the combination, under proper light, reflects the blue tint which is so desirable in a high-class specimen.

The crowning beauty of the Plymouth Rock is its purity of color. The two shades, one light and the other dark, must each be pure and

true to its color and positively free from any tinge of foreign color. This, to begin with, is the fundamental condition when selecting for proper coloring. When we have this purity of color, perfect surface color is assured.

#### PROPER BARRING.

There are two very important factors in the problem of barring often passed over without due attention; that is, the narrow and parallel lines of dark blue. The bars must be narrow and straight, those of the neck fine and distinct. Spots on the surface of the neck plumage are not bars. The barring of the neck must entirely cross the feather, barring it just as perfectly as the most perfect feather of the body. Or, in other words, fine lines of the darker color must extend across the light shade, as straight as if made with mechanical precision, from the point of the feather down close to the skin in perfect regularity.



FIG. 5.—Head of Barred Plymouth Rock female.

The lines in the smaller feathers close to the head are the finest, and they grow wider and more pronounced until they reach the lower portion of the hackle, which are about the same as the saddle plumage.

The saddle plumage of the male is another section that has the narrower lines of barring. While these lines are not so fine as in the neck plumage, they conform to one another in their graduation and style of lines. Often the most beautiful barring is present in this section. The prevalent defects found in these sections are the V-shaped bars and the broken lines, where the quill, or shaft of the feather, passes through them. In the latter the line, or bar, on one side of the quill will be its own width higher on the feather than the continuation of the same bar on the other side, thus:  $\rightarrow$   $\leftarrow$ . These two defects are quite serious, as they destroy the uniformity of surface bars, which should parallel each other, and, in addition to this, count against them in undercolor.

The body plumage, including breast of both male and female, is barred alike, being broader and more striking than in neck plumage. Each feather usually ends with the darker shade. When this is not the case the specimen is frequently too white for exhibition. It is especially important that the lines in these sections should be very uniform and straight. The dividing line between the light and dark shades must be very sharp and entirely free from bronzy shading.

The back plumage of the male should conform in shade and barring with its own hackle and saddle plumage. While the barring is not so

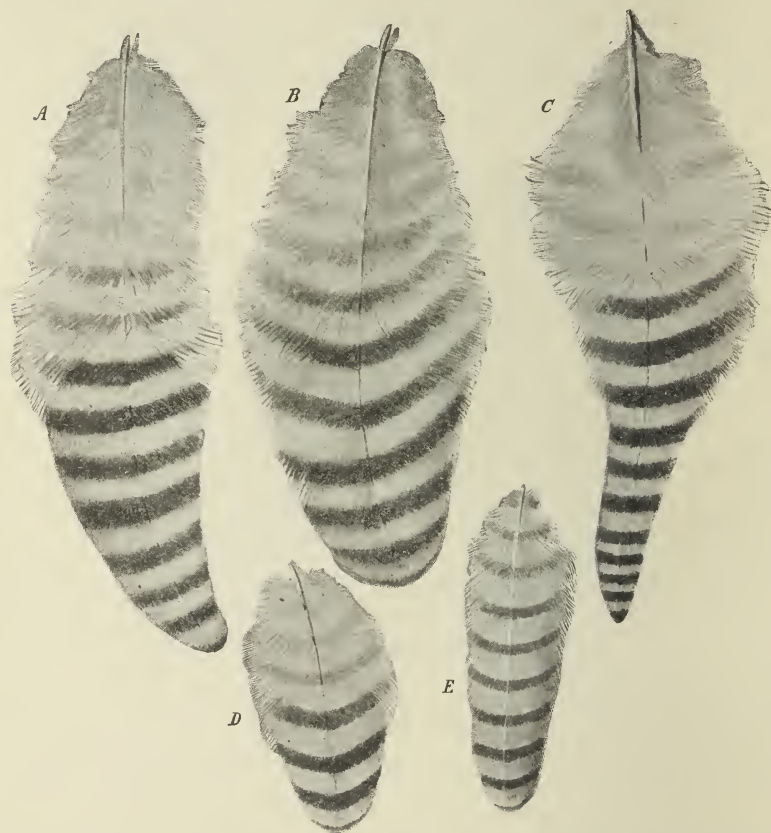


FIG. 6.—Feathers of Barred Plymouth Rock male. A, saddle; B, fluff; C, saddle; D, breast; E, back.

fine, neither should it be so heavy as to look out of place between the two. This portion of the fowl is one of the weakest color sections of the male bird. Metallic black will often show like a network over the back. Both red and bronzy feathers will come to the surface; and here, more than in any other section, is found the white undercolor. All these faults should be absolutely driven out.

The main tail feathers of both male and female should have the perfect barring, but should be considerably wider than in any other



section. Here, again, is often present the broken bars as shown above, and, being so much broader, they look the more out of place. The clear-colored, regularly barred tail feathers add considerable finish to any specimen, while poor color and irregular barring in the tail feathers, being always in sight, have an unfavorable bearing upon the other sections of the bird. One of the most beautiful effects of plumage comes from a profusion of handsomely marked feathers filling in underneath the tail. This not only vastly improves the general appearance of the fowl, but gives a perfect finish to the tail.

Wing bows of male birds are often defective. Here the barring is often weak and ticked, and the color of the flights of both male and female often have the appearance of gradually merging the one shade into the other. A wing with flights equaling the tail or secondaries in

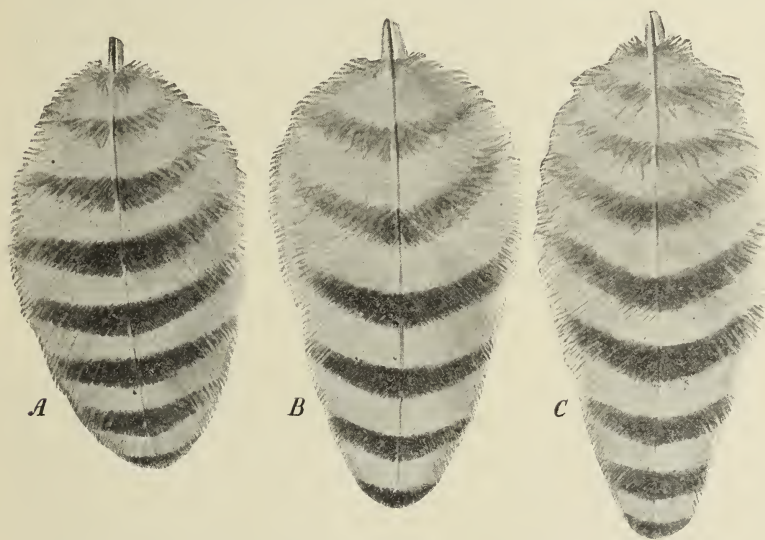


FIG. 7.—Feathers of Barred Plymouth Rock female. *A*, neck; *B*, shoulder; *C*, back.

color and barring is quite uncommon, a condition which seems seldom removed.

To sum up the subject of surface color: Whether it be of the very light shade sometimes seen, or much darker, or whatever shade the specimen may be, a uniform shade of color should prevail throughout the fowl. Let it not have a light neck with a dark saddle or back; neither will it do to have one shade on back and saddle, including tail, and another shade on breast. "The shade of surface color must be nearly or quite uniform throughout" to meet the Standard demand.

#### UNDERBARRING.

The barring must show on the entire length of the feathers in all sections when they are not mostly composed of down. This is the law for undercolor or barring, according to the Standard. Or, in other

words, all feathers other than the fluffy feathers that cover the posterior portion of the fowl shall show positive barring to the skin. This with some is taken to mean that the barring of underplumage must be quite as distinct as the surface barring, which is considered erroneous, it not being the intent of the wording of the Standard, as it simply calls for a "barring that positively shows itself the whole length of the feather." In this case a positive showing does not demand the same intensity of color under as upon the surface. While this is the intent of the Standard, at the same time the limited number that has been produced with underbarring approaching the distinctness and perfection of surface barring has attracted the greatest admiration of all who have seen them. Such instances point to this style of barring as being very near to perfection, as gauged by public opinion. If it is possible to produce such intense underbarring and hold the surface color clear and clean-cut, we shall assuredly have an attractive color and style of marking.

The weak points for underbarring are on the back of both male and female and just forward of the tail of the male. Not very long ago the surface of wing and the plumage of thigh of both male and female were quite deficient, but this is now much improved. The greatest trouble experienced with an excessive underbarring is an injury to surface color. The much barring to the skin carries with it such a predominance of strength in the darker shade as to influence the surface color undesirably and to show the metallic black rather strongly on the males.

When a clear, clean undercolor, nicely barred to the skin, quite plain enough to be readily seen, is obtained, the Standard demand is fulfilled. At the same time the most positive preference is shown, by all who are well informed, for the positive barring, provided it is clear, clean, and regular. Often those who are not fully acquainted with the methods of judging fail to understand why a fowl which fills the Standard demand in undercolor should be discounted as against the one with the better barring. The fact that one has better barring than the other must place it in advance on this point, at least.

With some, the wing flights are classed as under color, or barring. These are the most difficult to control and to bring within the desired color demand, and few specimens are ever seen that have flights that could be considered within the Standard line. Seldom do we see one in which the lines between the two colors are distinctly drawn. The tendency of the colors to run (as the saying is in the dye shop) seems to invade the flights.

#### MATINGS.

The formations, as shown in their origin, gives the greater strength of color to the female. The so-called top cross of the lighter-colored male with the darker-colored female still casts its influence toward the



WHITE PLYMOUTH ROCK MALE.

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WHITE PLYMOUTH ROCK FEMALE.



too dark female and the too light colored male. This natural condition, it is claimed, renders it quite impossible to produce the proper exhibition color males and females from the same pair. For this reason what is called the double-mating system has come into general use.

There are those who claim to produce exhibition males and females both from the same mating. While this is done to a certain extent, the facts are that by far the greater portion of our best exhibition Barred Plymouth Rocks are produced by the double-mating system. One of our most successful breeders states that each year his single-mating system comes nearer to achieving the same success as has been obtained heretofore from the extreme double matings.

#### THE SINGLE MATINGS.

When we speak of single matings for producing Barred Plymouth Rocks the possibility of being able to mate a pair, trio, or pen that will produce both males and females of high-class exhibition qualities is implied. If it is possible to select a pair that will produce both males and females of proper Standard color and shape, that have the very desirable surface color and barring, also the requisite amount of undercolor, then we have succeeded on the single-mating system. Until this is accomplished the single-mating method is not a success.

A Standard colored male mated to three or four hens, some of them light in color, some dark, and some medium, might produce both males and females of good quality. But that is not single mating. Single mating, in the strictest sense, is producing both males and females of the highest quality from a single pair. It must be the result of a true single mating of one pair of fowls, not a pen, nor yet a trio.

#### THE DOUBLE MATING.

This is the selection of what are called pullet-breeding females and mating them with pullet-producing males, for the express purpose of producing exhibition colored pullets; also the selection of cockerel-breeding females and mating them with cockerel-producing males for the purpose of obtaining exhibition cockerels. This is what is known as double mating.

For the production of pullets under this method, select females of perfect Standard color, in barring and underbarring; be careful as to clear, clean-cut barring that is absolutely perfect in all respects, so far as it is possible to obtain it; pay strict attention to the fine, close barring in the neck; see that this is really and properly barred and not marked with broken, or V-shaped, lines. Also look well to the tail, flight, and secondary feathers. Spare no pains in selecting the breeding females, taking only such as will satisfy thoroughly your desire were the same condition of plumage inherited by their future chicks.

With such females place a male of considerably lighter color than they are. Some use very thin-colored males. These very light-colored males with such females as are above described will produce light-colored pullets. Others take what might be called a medium shade and gain the medium color in females. The shade in this way can be partially guided in your pullets. The fact to be borne in mind is that with such females the lighter in color the male used the lighter the pullets will be. No matter what shade of color is preferred, let it be remembered that the male used for producing pullets must be lighter in shade than his mates and that his barring must be as near to perfection as possible. He must be well barred to the skin and free from all tendency toward white undercolor in back. When success in producing high-class exhibition females is attained and a line established that will produce them year after year, the males from these matings are most valuable as pullet breeders.

#### DOUBLE MATING FOR COCKERELS.

For producing males that will win in strong competition, select fine large females in shades of color considerably darker than Standard color. These females must be entirely free from any bad color. They must have fine, close, regular barring, running to the skin. It is quite useless to hope to produce good males, or in fact good fowls of any kind, from inferior females. Better by far to give all the time and attention to one pair or trio of real meritorious specimens than to hope for success that can never come from inferior stock.

After selecting these darker-colored females, place with them the finest male possible to obtain—one of perfect Standard color, marking, and undercolor. The nearer he comes to perfection in every section, the better will be his sons.

In all these matings, the barrings must be of straight, narrow type; they must be true and distinct in all the specimens used; the light-colored males must be as true in this respect as the darkest female. Each and every specimen must conform to all the demands of the Standard, as well as to the style and manner of barring.

#### GENERAL DEMANDS.

No fowl of any kind that is not true to its breed characteristics should be used as a breeder. The first requisite to be considered in selecting either a male or a female for these matings is to have present in each specimen a true Plymouth Rock form of the highest degree. It should always be borne in mind that the male largely influences color, while the female gives the size and general formation. A breeder that has a poor comb or deformity of any kind should never be used, and the strictest attention to proper color of eye, earlobe, beak, legs, and toes should be given. By following closely these suggestions and selecting,



when it is possible, specimens that have been bred in line for males or females, as the case may be, for years, success in producing high-class Barred Plymouth Rocks should be attained.

#### WHITE PLYMOUTH ROCKS.

The White Plymouth Rocks are (so-called) sports from the Barred variety. There are two causes found for such a variation in the formation of the breed—first, the Black Java was part of the original foundation stock, and all solid black fowls are apt to occasionally throw white chicks; and, second, the cross of the white Asiatic fowl, for the purpose of enlarging the size, clearing the plumage, and increasing the size of their eggs, might be expected to occasionally crop out in the offspring. It is not surprising, therefore, that white fowls have been occasionally produced; the greatest surprise in their appearance is their good Plymouth Rock form.

#### THEIR ORIGIN.

About 1875 or 1876 Mr. Oscar F. Frost, of Monmouth, Me., had hatched from eggs laid by Barred Plymouth Rocks some white chicks that grew to be good Plymouth Rocks in shape, but white in color. These are said to have been the first that were ever mentioned up to that time as having made an appearance. As soon as it was admitted that such was the case, others through the country claimed to have had the same experience in their flocks. In almost every case they seemed to come from either the Essex or the Drake strain of birds.

The originator of what was known as the Essex strain of Barred Plymouth Rocks claims to have crossed into his flock a fowl called the White Birmingham. It is claimed by some that this is the true reason for this strain producing white fowls. There was considerable activity in an effort by those who disliked the idea of allowing a white fowl to be called a Plymouth Rock to have them named Birminghams, but the satisfactory establishment of their descent from the Plymouth Rocks, the evidence that they reproduced their qualities, and the presence of as good form as could be shown in the Barred variety secured to them their right to the family name.

When we speak of this variety as a sport from the Barred Rocks, we mean that eggs laid by the Barred variety produced these white specimens, and that this was simply the reappearance of ancestral characters through the action of well-known laws of heredity. It is asserted that it is not an unusual occurrence for some lots of Barred Plymouth Rocks to produce solid or almost solid black fowls. This also might be expected, since there were black as well as white breeds used for foundation stock.

When solid black fowls produce pure white offspring these are called Albinos. This is looked upon as a weakness in color of the

parent birds. But when any made breed shows a tendency to "throw back" to any one of its ancestors it is called a reversionary tendency, or the going back to an ancestor. In this case the white specimen took the color of one of its ancestors and held to the shape of its immediate family.

#### COLOR CONDITIONS.

We must not have the impression that the first of these white sports had good clear color, for they had not. It took several years of great care in mating to get them started toward breeding true. This, however, is not remarkable, since our very oldest known breeds will not breed absolutely true at all times. A new variety could not be expected to do better than those which have been carefully selected for many years.

As the result of patience, skill, and good judgment we now have the White Plymouth Rock, which is of as good form as can be found in the Barred variety. They fully equal them in size, and their color is as pure white as is seen on any fowl. Many of them are pure white in plumage, with beaks, shanks, and feet of beautiful orange yellow, giving the combination of color so popular in this country.

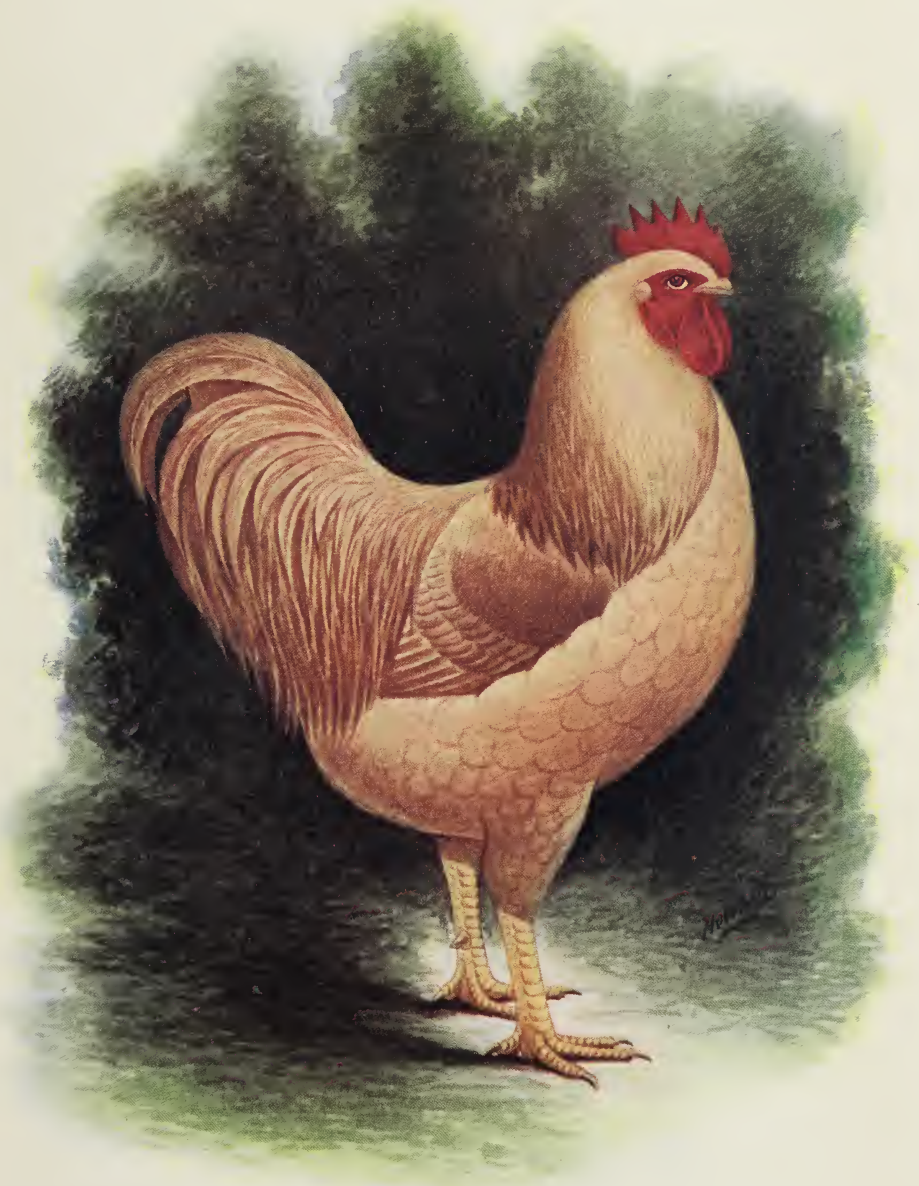
#### PROPER MATINGS.

As stated before, all Plymouth Rocks, no matter of what variety-color they may be, must have the same shape. There is but the one true Plymouth Rock shape. An effort has been made to state plainly in previous pages just what this should be, and the first and most essential requirement is that all specimens of the white variety that are used for breeding shall be most perfect in Plymouth Rock shape. As there are but two conditions of quality to be considered—good shape and pure color—it is of the greatest importance to have them both as near to perfection as possible.

Fine large specimens of most perfect Plymouth Rock shape which are pure white in color and whose head, comb, and eyes are right up to Standard demands are the only kind worth consideration for breeding purposes. With these they must also have a good, richly colored, yellow beak, shanks, and feet. It is simply folly to hope to produce good high-class show specimens from under-sized, ill-shaped, poor-colored specimens. If simply handling them for eggs, select the best egg producers and keep them; but if breeding for exhibition, do not waste time trying to succeed with even fair quality. To succeed it is necessary to have the very best.

#### WHITE AS A COLOR.

The pure white plumage of a fowl is quite as difficult to obtain in perfection as any of the variety colors; yellowish or creamy tints, also black specks, will show in the feathers of the very best strains. Often



BUFF PLYMOUTH ROCK MALE.

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BUFF PLYMOUTH ROCK FEMALE.

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when the surface plumage appears white, the undercolor will show the creamy tint. This discoloration is often prevalent in the quills of the wings and tail feathers, also in the back just in front of the tail. The presence of the creamy or yellow tint destroys a specimen for either breeding or exhibition purposes.

White fowls that have this yellowish cast in plumage are usually the most vigorous of the flock, while those that are absolutely pure white are often rather delicate as compared with the others. It is frequently the case that sprinklings of black will be found in parts of the plumage of the whitest specimens. These small spots of black look like sprinklings of pepper on some of the feathers. This most usually shows itself in wing flights or on back plumage. At times solid black feathers will show themselves; usually they crop out on the back or on the body just under the wing bow.

When selecting breeders for market purposes, for both eggs and market poultry, the largest and most vigorous specimens, without regard to yellowish cast in plumage, should be selected. Size, strength, and constitution should be the first consideration for producing stock for eggs, broilers, and market poultry. But when selecting for production of exhibition specimens use only those that are absolutely white to the skin, including quill feathers.

#### BUFF PLYMOUTH ROCKS.

The whole fraternity of poultry fanciers thought the advent of the new white varieties marked the full tide of success with fowls; but when the facts as to new buff breeds shone upon us, all interested in fancy fowls, to a greater or less extent, went, as might be said, color mad. Even to this day men will argue the question as to the shade of color, and present as samples of true buff color specimens ranging from lemon yellow to snuff brown, some one calling each shade the proper color.

It is acknowledged that there have been two original strains of the Buff Plymouth Rocks—the one called the Wilson strain, the other the Fall River strain. The Wilson strain originated with Mr. J. D. Wilson, of Worcester, N. Y., from Buff Cochins and Light Brahmas. The Fall River strain was produced by Mr. R. G. Buffington, Dr. Aldrich, and others, at Fall River, Mass., by crossing Rhode Island Reds and White Plymouth Rocks; also from selected Rhode Island Reds that had fairly good Plymouth Rock shape and buff color. The Rhode Island Reds selected for this purpose had more or less Plymouth Rock blood in their veins.

These early productions had black tails, dark flights, almost red body color, and very red wing bows. The Wilson strain had the better size and color; the Fall River strain better form. From the union of the two, those interested have produced a fowl that has the true

breed characteristics, also good size and color. Few varieties have advanced so fast as these in real quality of both form and feather.

It is not unusual to see male birds of true color, through and through, while in females true color is so common as to be practically established; yet in some cases the color is thin and washy, and in others too deep or too red. But even with these faults their handlers have shown great skill in bringing them to their present condition in so few years, notwithstanding an undercurrent of hereditary forces tending toward many shapes and colors which came through their original make-up.

It can not be too strongly emphasized that all Plymouth Rocks must have the same shape, form, and breed characteristics. That the shape makes the breed is ever true, while color is simply the emblem of the variety. In all solid-colored fowls we have the right to hope for better form than in particolored ones. For this reason we should expect the most perfect Plymouth Rocks in this variety.

In mating these fowls for producing the highest class specimens, first of all select good size, vigor, and Plymouth Rock shape; always looking well to the quality of comb, eyes, wattles, earlobes, beak, shanks, and feet. In addition, have good even color as described below.

#### BUFF COLOR AND HOW PRODUCED.

The Standard calls for one even shade of true golden buff throughout. This is a most simple proposition that tells us in the plainest possible language that all buff fowls must be a true buff of golden hue; not lemon buff, nor reddish buff; neither shall it be reddish brown nor snuff brown, but true and simple "golden buff" which approaches a true colored chamois skin or one of our American (yellow) gold coins.

With buff fowls, more than those of any other color, the greatest attention must be paid to the color of the male. It is almost a hopeless task to try to produce good true-colored buff chicks from poorly or thin-colored males. The color of the male that is to be used for a breeding fowl should be very true and even—neither thin nor ticked. The color should be filled in very closely and dense, so as to make a strong, solid, true surface color that should be well sustained by undercolor to the skin, a shade or two lighter than surface color, but just as true.

It is erroneous to give undue credit for color qualities to the thin-colored specimens which are so weak in color as to look like a faded-out lemon color, and so thin as to allow the white undercolor (which is usual in such specimens) to show through. Such is not buff color. It has no more right to be called true Standard buff than has the red or snuff-brown shades.

After selecting a true-colored male that has the same even shade of buff all over—allowing for the glossy finish of neck and upper



portions of body, including wings, which must be of the same even shade—mate him with the very truest colored females that it is possible to obtain. Always follow this rule if possible: Have the females of the true golden hue of buff as called for in the Standard, while the color of the male's breast plumage should be one or two shades deeper in color than the breast of the females.

Never mate deep red-colored specimens with paler lemon-colored ones. This will bring mixed or mossy surface color. The way to establish good, lasting buff color of the proper shade is to mate good, true buff colors together year after year till this color is thoroughly established in the blood, when it can be depended upon to reproduce itself.

The most constant defects in the buff color are the red that comes on the wing bow, the black that comes on the tail and wings, and the white that comes in the tail, wings, and undercolor. Some one of these is always present. A surplus of black seems to drive the others out. Years of experience have taught those who have bred buff fowls that it is a good plan to confine the black to the tail feathers and to hold just a little of it hidden away in the main tail plumage. This can be done, and it helps to fortify against the white. All specimens having the red wing bows should be discarded and used simply as market poultry.

#### FAULTS TO AVOID.

By all means keep your Plymouth Rocks up in size. Have them look their character. A small-looking specimen which is so fat as to pass muster underweight demands is simply a heavyweight small bird. Breed them to good size. Have them look to be full-sized Plymouth Rocks. It is the good, reasonable size that is needed—not over fat, so as to weigh in at Standard weights. Poor combs are entirely too prevalent. Pay more attention to all head portions, for they count largely for or against the specimen. All fowls should have good, bright, rich-colored eyes. Nothing detracts more from their beauty than poor shape or poor color of eyes. Stamp out the tendency to feathers on shanks or between the toes. Destroy these by sending all that show the slightest tendency to this defect to be market poultry.

The Rhode Island cross still shows its presence by marking some of the hackle feathers with black. Watch for this continually and get rid of it. Keep clear of all unevenness in color and do not allow the color to run thin and light in shade; at the same time avoid the deep dark shades that properly belong to the Rhode Island Reds. Select the true-shaped, true-colored specimens and hold to them and breed for better results, thus building true and well as the stock advances closer and closer to the line of perfection.

## THE PEA-COMBED VARIETY.

One of the results of the many additions of new blood used for improving the Barred Plymouth Rock is a barred fowl with the Pea, or Brahma, comb. Such specimens came from true Plymouth Rock matings, and were fostered by several who believed the style of comb to be of advantage. As to their origin, the words of Mr. H. S. Babcock, who, more than any other person, should have the credit of their origin, are quoted. He writes:

In searching for its origin the writer has received hundreds of letters showing that in various flocks, at sundry times and in divers places, Pea-Combed chickens have appeared, the parents being single-combed thoroughbred Plymouth Rocks. These fowls were so kept that a cross was impossible, in some cases being the only variety upon the place or in the immediate vicinity. The testimony was simply overwhelming in favor of the assertion that the Pea-Combed birds were just as pure in blood as the single-combed ones, and hence they were regarded as a "sport" of the single-



FIG. 8.—Head of Pea-Comb Barred Plymouth Rock male.

combed Plymouth Rocks. A "sport" they have been called, and perhaps justly, though there appears a possibility of considering them a reversion, for it appears from considerable testimony that the single-combed Barred Plymouth Rocks had in their veins a decidedly mixed blood. For example, Mr. I. K. Felch declared in an article written about the time the Pea-Combed Barred Plymouth Rock was admitted to the Standard that a certain breeder of single-combed Barred Plymouth Rocks, acting upon his advice, had bred into his strain the blood of the Light Brahma, and that when the Light Brahma blood had been reduced to one-eighth, the resulting birds were winners. Again, a prominent breeder of Barred Plymouth Rocks told the writer that he had personally crossed into the original Essex strain a Black-red Pit Game, in order to give more vivacity to the fowls, and then had bred out the strictly Game characteristics. It was also learned that another prominent early strain had in its composition the blood of the Dark Brahma, and it is well known that the Black Java used in the making of the original Plymouth Rocks was an Asiatic fowl, and all Asiatic fowls have a tendency to produce pea combs. Inasmuch as the Brahmas, Light and Dark, are pea-combed fowls, and as Pit Games produce all

manner of combs—single, rose, nub, strawberry, and pea—and as all Asiatics have a tendency toward the production of the pea comb, it is possible that the comb upon the Plymouth Rock is due, not to sporting, which means the production of an entirely new character, one not possessed by any ancestor, but to reversion, in this instance affecting the comb only of the fowls. But to one or the other cause (either to sporting or reversion) the pea comb of the Plymouth Rock must be referred, for no immediate cross for its production was ever made. The Pea-Combed Plymouth Rock is as pure in blood as its single-combed ancestor; it is a Plymouth Rock, and nothing else.

In breeding it presents exactly the same problem that the single-combed varieties present—careful mating for color and the preservation of the true Plymouth Rock type. In the barred birds the color problem is a difficult one, but not beyond the skill of a good breeder. In this variety the color demand was not forced by competition to the same high limit. For this reason good show specimens were produced from the single-mating system. If still popular at this time, it would be necessary to use the other system to keep to the present demand.

This variety never became popular as a fancy fowl, but was quite extensively kept for eggs and dressed-poultry purposes, until finally it was admitted that they were far better calculated for utility than for exhibition. This condition caused them to be dropped from the list of standard fowls, and at the present time they are seldom seen outside the confines of poultry farms, where they are much valued for their continual egg yield and quick growth for broilers and market poultry.

#### BREEDS ALLIED TO THE PLYMOUTH ROCKS.

##### THE JERSEY BLUE.

Jersey Blues are mentioned as among the very earliest productions of American fowls. They were named after the State from which they originated, and became popular on account of their prolific egg yield. Early records tell us that they are the result of a cross between the Great Malay and some one of our other breeds (name unknown), and that the product was a rather long-legged fowl, neither valued as an egg producer nor as a good market fowl. No doubt this original cross from the Malay had the long legs and inferior egg capacity, both of which belong to the Malay family. Why such a cross should be inferior as table poultry can only be accounted for on the ground of poor care or perhaps a Spanish cross.

The Great Malay of early day did not have the beautiful black-red colors of the present, nor were they the equal in many ways of our present type. As described in their advent, the Jersey Blues were large-sized long-legged fowls, of a bluish cast in plumage, weighing, when full grown, from 12 to 16 pounds per pair. All these facts point to a Malay crossed with either Black Spanish or Java.

Blue fowls, from all time, have come as the result of many crosses: Dark Brahmas crossed with Black Spanish, Minorca crosses, and pure

white and pure black fowls, all have produced fowls having blue color in plumage. The entire make-up of the Jersey Blue is similar to that of the Andalusian, which is of Spanish origin, and no doubt the result of crossing a Black and White Spanish fowl, or perhaps two black fowls of different breeds, as it is a well-established fact that either cross may produce a blue specimen.

The present form and color of the Jersey Blue would rather incline one to believe that they are the result of an Asiatic-Java cross. The absence of the white earlobe shuts out the probability of a Spanish cross, while their large, heavy bodies and underformation resemble



FIG. 9.—Feathers of Jersey Blue male. A, tail; B, breast; C, hackle; D, saddle.

the Asiatic family. They have dark eyes, single combs, red earlobes, and smooth legs. The color of body plumage of the male is slaty blue, each feather being laced about the edge with a darker color; top plumage, including neck, back, saddle, and wings, a metallic blue-black; main tail feathers should be blue or bluish black; beak, legs, and toes of both male and female dark or slate color.

The female should be slaty blue in color all over, each feather being laced around the edge with a darker shade (color and lacing like that of the Andalusian); the neck somewhat darker than body color; they are of good size, deep and full in breast and body; not long in legs, rather



active. They produce an average number of eggs that are of a brown color (indicating that they are not of Spanish origin), medium in size, good rich flavor. In fact, they are the counterpart of the Andalusian in color and activity, while favoring the Brahma in size and shape of body. Even at this late day they show an inclination occasionally to produce chicks with some feathers on their shanks, suggesting their ancestry.

The Jersey Blue, like the Pea-Combed Plymouth Rock, was formerly allowed a place in our Standard, but so little attention was paid to its improvement that it was thought best to withdraw it from a position

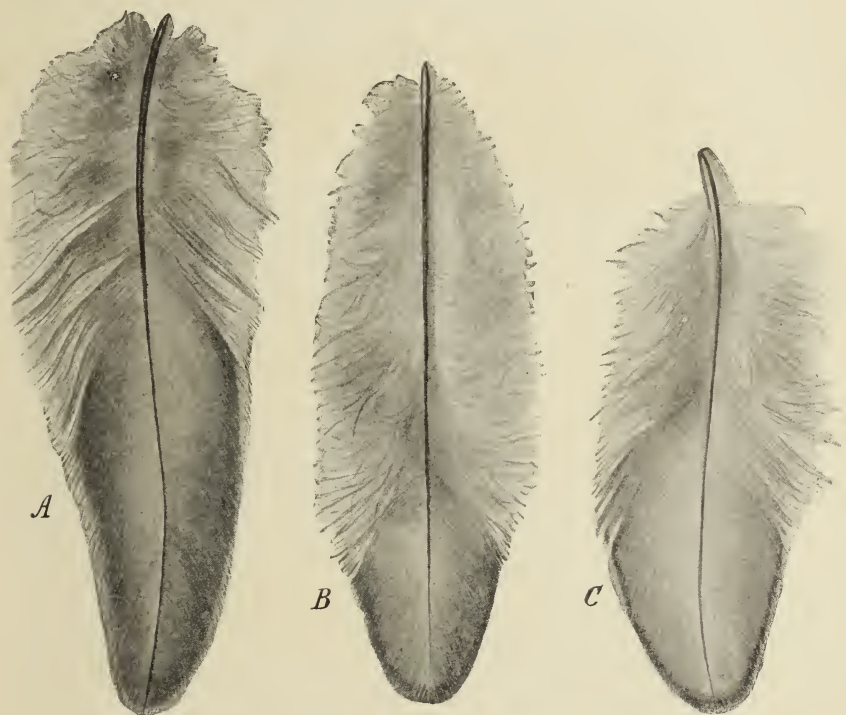


FIG. 10.—Feathers of Jersey Blue female. *A*, neck; *B*, back; *C*, breast.

among those called Standard fowls and allow it to occupy the place which it so long filled among the utility fowls.

#### THE RHODE ISLAND RED.

Few new varieties or breeds of fowls have enjoyed a more quickly gained prominence than has come to the present up-to-date Rhode Island Red. They have been brought into line by breeders known as utility men, who claim for them all requirements that go to make the general-purpose fowl. Yet, withal, we do not think that their ardent admirers claim they will produce any greater number of eggs or better eggs, or that they are any better for market poultry than others of

our many American varieties. But if they lack any quality that would go to make them as good as the best it has been successfully hidden by the claims of superiority.

The Rhode Island Red is a result of continued interchanging of male birds for new blood until its present make-up combines about all the best breeds known to this country. Among these are the Malay Game and the early so-called Shanghai, the Dominique, Brown Leghorn, Brahma, Plymouth Rock, and Wyandotte. From time to time all of these have been added by one breeder or another, and specimens produced by these numerous crosses have been exchanged until all the extensive flocks of egg-producing market poultry throughout the State of Rhode Island are more or less of the same type. The Rhode Island Reds in the Fall River districts of Massachusetts have now the greater reputation.

These numerous crosses have many styles of combs, forms of body, and colors of plumage. The facts are that many flocks of these Rhode Island Reds look like the barnyard fowls found so commonly in the West; perhaps a little larger, but no more regular in color of plumage, shape of body, or form of comb. The demand for solid red males with good single combs, to be used in building up the new Buff Plymouth Rocks, prompted the breeding of them to a definite type and color. Since then more care and attention has been given to breeding in accordance with the Standard rules of the Rhode Island Red Club.

The form of the accepted (or club-adopted) Rhode Island Reds favor the Plymouth Rock. They are rather longer in back and the male has considerably more tail plumage. In size they are rather smaller than the Plymouth Rock; in constitutional vigor very strong, and, like all crossbred fowls, grow fast, feather quickly, and begin to lay rather early, for a large fowl. Their qualities are now fairly well transmitted to their offspring.

The adopted shade of color for the true-bred specimen is red for the male and a modified shade of the same color for the female. They range in color from a reddish orange to the deepest possible shade of dark red for the male, while the females range from a dark buff to a snuff brown. Only a small percentage of those produced can be expected to have the exact color of the parent bird. This uncertainty of color transmission, however, has been improved upon each year, and there can be no possible reason why this bird should not be finally guided into true breeding strains.

They have single combs, like the Plymouth Rock, also rose combs like the Wyandotte, and some are produced with the pea comb, like the Brahma. All these colors of plumage and styles of comb may be found of advantage in building up one or more useful varieties of this new breed.















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